PIGMENTS
FOR COATINGS

SCHLENK

World of Metallics

ALUMINIUM & GOLDBRONZE PIGMENTS

PIGMENTS FOR COATINGS

World of Meta

PIGMENTS




Metallic Pigments for Coatings

Metallic pigments are utilized in the coatings industry for numerous and differing applications. Besides creating the typical "metallic effect", they are also used to fulfill functional requirements such as corrosion protection, conductivity, and others:

Automotive Coatings
– OEM
– Refinish
– Parts and Accessories
Plastic Coatings (ex. Consumer Electronics)
– TV Cabinets, cell phones, cameras, computer housings, etc.
Coil Coatings
Can Coatings
Powder Coatings
General Industrial Coatings
Anti-Corrosion Coatings
Watercraft Primer Coatings
Roof Coatings
Decorative Coatings (including aerosol)
and many more

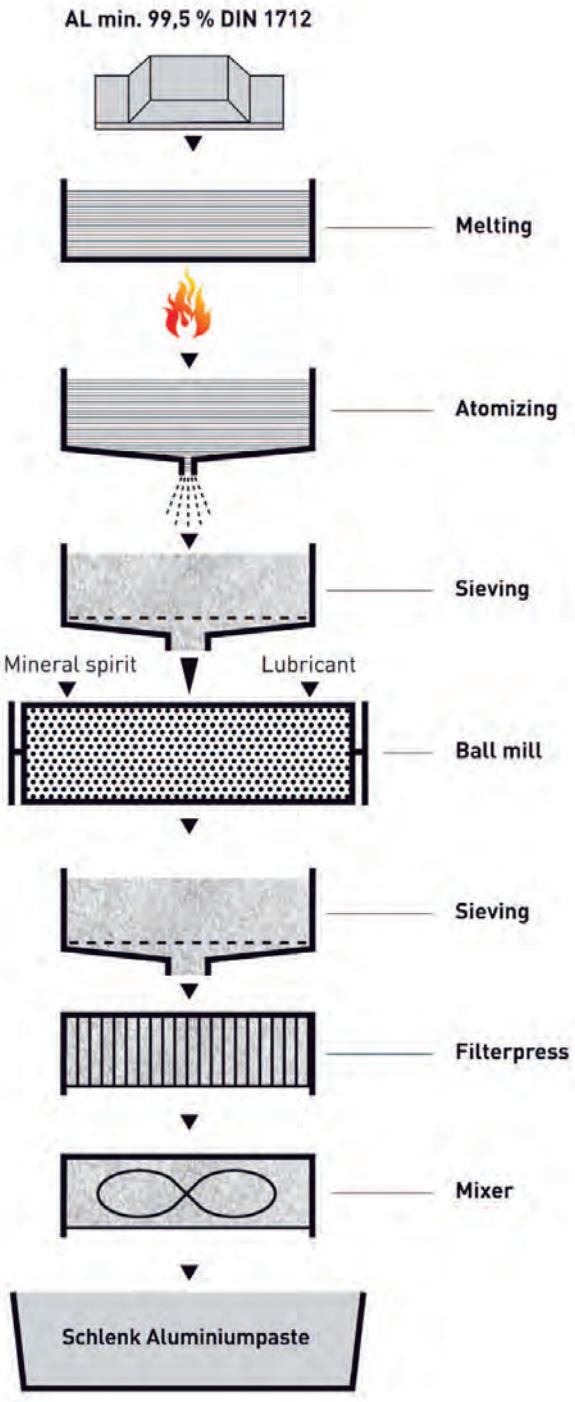
The flakes particle size ranges from 5 to >50 µm in diameter and a thickness of 20 nm (VMP) to 1µm. These metal pigments are composed of aluminium and brass alloys, commonly referred to as gold bronze pigments.



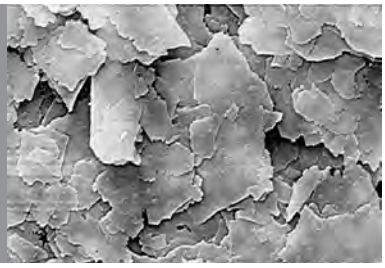

The Manufacturing process of Aluminium Pigments

Modern aluminium pigments are produced in a wet milling process in ball mills (Hall Process), whereas gold bronze pigments are produced in a dry milling process (Hametag Process).
The manufacturing process begins with milling atomized aluminium powder to the desired particle size and form in white spirit / mineral spirits with the addition of lubricating additives. After a screening and classification process, the pigment suspension in the mixer is pressed out and the "press cake"is adjusted with solvents to a metal content of typically 65 %.

Should the end application require solvents other than hydrocarbons (ex. pastes in water, water solutable solvents, or other types of solvents), the press cake is dried and the powder again is pasted with the required solvents or water.

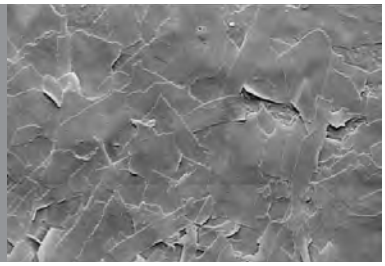


Cornflake



Silverdollar

VMP



So called "Vacuum Metallized Pigments" ("VMP"), our DECOMET series, are produced by releasing aluminium of metallized films. The aluminium is then further processed and the particle size adjusted. These pigments are considerably thinner and offer a surface which is substantially smoother and therefore much more reflective than conventional aluminium flakes.

Depending on the production process we distinguish between

- Lamellar flakes (Cornflakes)
- Lenticular flakes (Silver-dollars)
- Vacuum Metallized Pigments (VMP's)

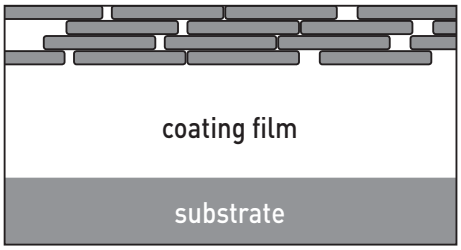
Leafing/Non leafing

As a result of the wetting behavior of the flakes, the metallic pigments either float on the wet film (leafing), building a layer of pigments on the film surface, or the pigments become fully wetted out and distribute themselves homogeneously in the paint film (non leafing).

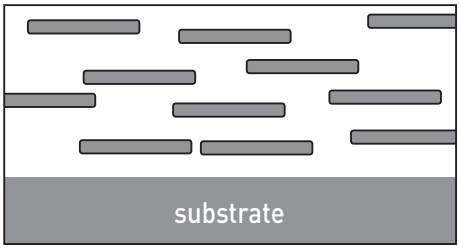
The wetting behavior is determined by the lubricating additives used in the milling process. Leafing pigments are achieved when using stearic acid whereas non leafing pigments can be produced when unsaturated fatty acids (ex. oleic acid) are used.

Leafing pigments create a silver "metallic effect" and are primarily used in corrosion protection coatings, decorative coatings, as well as roof coatings.
The disadvantage of the leafing effect is its poor recoatability (either with itself or a clearcoat) and abrasion resistance. Tinted metal effects are not possible because of the pigment orientation.

As non leafing pigments are distributed homogenously throughout the paint film, these are better protected from abrasion and corrosive influences. They can easily be over-coated.



LEAFING-PIGMENT



NON LEAFING-PIGMENT

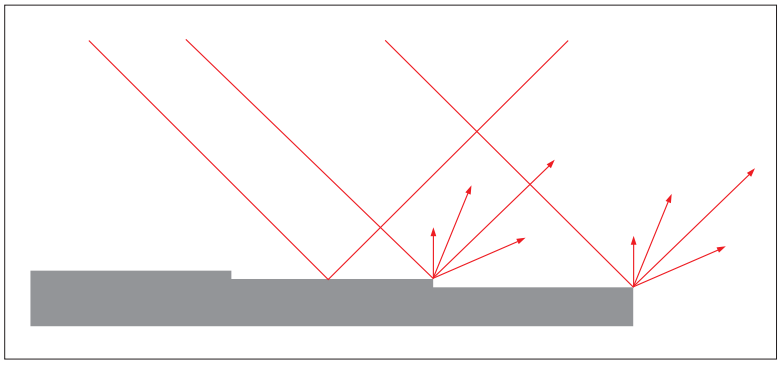
One of the main advantages, however, is the possibility to create tinted "metallic effects" when mixing the metallic pigment with transparent pigment.

Typical applications include anti-corrosion and general industrial coatings.

Non leafing aluminium pigments that meet the quality criteria below are primarily used in automotive coatings (typically used with an additional clearcoat) as well as in high quality industrial coatings for coil, can and plastics applications.

The "Metallic Effect"

Physically, the "metallic effect" is based on the reflection of light on the smooth surface of the pigment. This reflection however is overlayed by the light scattered at the edges of the flake and by the micro-roughness of the pigment surface. Therefore the "metallic effect" is the sum of the reflection and the scattering of light. The higher the ratio of reflected light, the more intense is the "metallic effect".



light reflection at lamellar smooth surfaces
light scattering at edges and rough surfaces

This results in the following quality criteria, which, depending on the application, are to be considered when metallic pigments are selected.

Particle Size

The larger the particle (= the reflecting surface), the greater the "metallic effect" (brilliance, "sparkle effect"). The finer the particle, the higher the scattering at the edges. Consequently, the effect becomes more homogenous but also darker.

The selection of particle size is primarily determined by the manufacturing technology and is described by the d50-value (average particle size). Typical metal pigments range from approximately 3 µm (offset printing) to over 50 µm ("high sparkle effect").
The aluminium pigments used for automotive coatings, consumer electronics, coil coatings, powder coatings and other applications offer a d50 range of approximately 8 – 25 µm.

Particle shape – Pigment Morphology

With the development of the "Silver-dollar Pigments", new spheres in "metallic effects" could be created. As a result of the coin-like particle form and the smooth surface, the reflection is maximized and the amount of scattered light is significantly reduced. The "metallic effect" becomes more intense and the brilliance and brightness is clearly enhanced when compared to similar size "cornflake pigments". Silky luster effects can be achieved with fine "Silverdollars". This pigment class (d50: 8 – 20 µm) is presently the most utilized aluminium in metallic automotive coatings and high quality industrial coatings.

Particle Size Distribution

Also here the same rule applies: the higher the portion of fine and very fine pigments particles, the higher the scattering of light, resulting in the loss of the metallic appearance. However, particles that are too coarse, have a detrimental effect in the application process and visual effects (surface gloss, "DOI-value", opacity etc.). Therefore, in recent years R&D efforts have focused on pigments that have excellent morphology and are tightly classified within the required particle size category.

Pigment Orientation

In addition to the above described characteristics: particle size, particle size distribution and pigment morphology, the orientation of pigment particles when applied is of extreme importance.

The more parallel the metallic flakes are oriented in the coating film, the better the level of light reflection and thus the better the "metallic effect".
Depending on the end use, the formula and application conditions play a decisive role here.

Flop Effect

The "Flop Effect" (also known as "two-tone or travel ") must also be addressed. Besides brilliance, gloss, and "sparkle", it is one of the most characteristic criteria of the "metallic effect". Flop considers the brightness in relationship to the viewing angle. Close to the gloss angle one can measure maximum brilliance; whereas when viewing from a different angle, the effect appears considerably darker. Three dimensional objects, as for example car bodies, appear much more sculpted and of higher quality. This surely contributed strongly to the success of such "metallic effects" in automotive coating applications.

Metal Pigments for Environmentally Friendly Coating Systems

One essential requirement of the environmentally conscious coatings industry is the reduction of volatile organic compounds or VOC's.

This can be achieved by reducing the solvent content step by step, even to the extent of making completely solvent free coatings, such as powder coatings

Low solids	Medium solids	High solids	Powder coatings
10-30 %	30-50 %	50-80 %	100 % solids

Low or no VOC can also be achieved when organic solvents are replaced with water in so called "water borne coatings"

In energy cured coatings systems (UV or EB) solvents are replaced with monomers, which are chemically integrated into the dry film through polymerization and are therefore also considered "VOC free".

Also, improved application processes with better efficiency (ex. electrostatic spray) or complete solvent recycling via incineration (ex. coil coating) help to protect our environment.

In any of these modern applications metallic pigments are widely used.

These as well as other special applications make it necessary to customize these pigments with special chemical treatments (ex. organic or inorganic surface coatings).

Water Borne Coating Systems

The primary problem with water borne coating systems is the gassing stability of the metal pigments, which has an impact on storage stability.
The underlying chemical reaction of aluminium and water, which creates hydrogen gas can be prevented either by utilizing suitable inhibitors (e.g. organic phosphorus compounds) or by coating the surface with silica.

Powder Coatings

Metallic powder coatings should not be produced in a co-extrusion process. The high shear forces, especially in the milling process, would destroy the flakes and severely influence the effect. However, if it still desired to utilize metallic pigments in this process, it is recommended to use pigment-binding agent compositions, such as pellets (GRANDAL for aluminiums, GRANDOR for bronzes).
Metal pigments are primarily used in the Dry Blend Process or are bonded to the powder resin in a special bonding process to assure the reuseability of overspray.

Effect, electric chargeability, as well as chemical resistance of the pigment are all positively influenced through special surface coatings of the pigments.
As an example with Powdal XT, new technology made it possible to fulfill the stringent requirements of the construction industry such as certain AAMA specifications (hydrochloric acid, nitric acid, and mortar testing) and GSB-Norm.

With modern surface treatments also other requirements are achieved:

- **humidity resistance and intercoat adhesion for automotive OEM**
- **circulation resistance for automotive OEM**
- **“shock-proof“ TV-cabinet coatings**
- **chemical resistance for consumer electronics, appliances, and automotive interior**
- **weather resistance for external use (powder coating, coil coating)**

Additional information is provided under the individual special product categories.

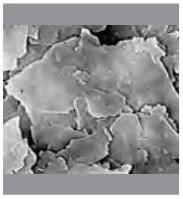
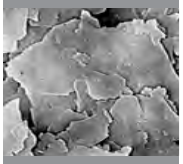
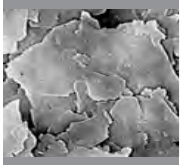
Guideline-formulations, technical information as well as our competent technical service are available globally.

1 Aluminium Pigments leafing

Leafing pigments provide a bright metallic – almost white – appearance and are available in powder and paste form.

PP Powders

Aquasilber LPW Waterpastes

Morphology	Product Denomination	non-volatile content %	Solvent
	EM / 70	65 ± 2	white spirit
	EM / 90	65 ± 2	white spirit
	EM / 110	65 ± 2	white spirit
	EM / 130	65 ± 2	white spirit
	PP / 770	100	–
	PP / 970	100	–
	PP / 1170	100	–
	PP / 1370	100	–
	Metaface 2150	100	–
	Aquasilber LPW / 780	65 ± 2	water
	Aquasilber LPW / 980	65 ± 2	water
	Aquasilber LPW / 1180	65 ± 2	water
	Aquasilber LPW / 1380	65 ± 2	water
	Aquasilber LPW / 2150	65 ± 2	water

Aluminium Pigments leafing

D50-value approx. µm	Applications	Outstanding Features
20		standard white spirit pastes
17		
13		
10		
20		powders – free of any solvent
17		
13		
10		
13		
20		stabilized leafing pastes for **waterborne** systems
17		
13		
10		
13		

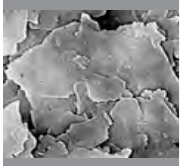
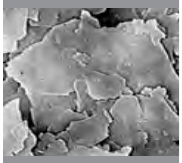
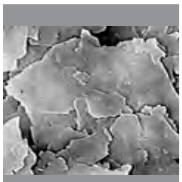
2 Aluminium Pigments non leafing

2.1 Cornflakes for solventborne systems

POLYTOP **Economy** cornflake series

ALUMET **Standard** cornflake series

ALUCAR **Premium** cornflake series

Morphology	Product Denomination	non-volatile content %	Solvent
	Polytop 1050	65 ± 2	white spirit / aromatics
	Polytop 1060	65 ± 2	white spirit / aromatics
	Polytop 1070	65 ± 2	white spirit / aromatics
	Polytop 0900	65 ± 2	white spirit
	Polytop 0130	65 ± 2	white spirit
	Polytop 0160	60 ± 2	white spirit
	Alumet 1200	65 ± 2	white spirit / aromatics
	Alumet 1500	65 ± 2	white spirit / aromatics
	Alumet 1600	65 ± 2	white spirit / aromatics
	Alumet 1700	65 ± 2	white spirit / aromatics
	Alumet 1800	65 ± 2	white spirit / aromatics
	Alucar 2600	65 ± 2	white spirit / aromatics
	Alucar 2650	65 ± 2	white spirit / aromatics
	Alucar 2700	65 ± 2	white spirit / aromatics
	Alucar 2900	65 ± 2	white spirit / aromatics

Aluminium Pigments non leafing

D50-value approx. µm	Applications	Outstanding Features
22		wide particle size distribution, excellent hiding power
20		
18		
14		
11		
8		
32		narrower particle size distribution, good hiding power, good metallic appearance
22		
20		
18		
14		
24		very narrow particle size distribution, bright metallic appearance
20		
17		
11		

2 Aluminium Pigments non leafing

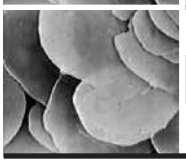
2.2 Silverdollars for solventborne systems

ALUBRIGHT 3000 **Standard series –** Coarse to medium fine silverdollar grades

ALUSHINE 6000 **Standard series –** Medium to fine silverdollar grades

ALUSHINE 7000 **Premium series –** Medium to fine silverdollar grades

ALUSTAR 8000 **Premium series –** Thin silverdollar grades

Morphology	Product Denomination	non-volatile content %	Solvent
	Alubright 3100	70 ± 2	white spirit / aromatics
	Alubright 3200	70 ± 2	white spirit / aromatics
	Alubright 3250	70 ± 2	white spirit / aromatics
	Alubright 3400	70 ± 2	white spirit / aromatics
	Alubright 3600	70 ± 2	white spirit / aromatics
	Alubright 3700	70 ± 2	white spirit / aromatics
	Alubright 3800	65 ± 2	white spirit / aromatics
	Alubright 3900	65 ± 2	white spirit / aromatics
	Alushine 6200	70 ± 2	white spirit / aromatics
	Alushine 6400	70 ± 2	white spirit / aromatics
	Alushine 6600	70 ± 2	white spirit / aromatics
	Alushine 6600 XB	70 ± 2	white spirit / aromatics
	Alushine 6900	70 ± 2	white spirit / aromatics
	Alushine 7400	70 ± 2	white spirit / aromatics
	Alushine 7600	70 ± 2	white spirit / aromatics
	Alushine 7800	60 ± 2	white spirit / aromatics
			
	Alustar 8500	60 ± 2	white spirit / aromatics

Aluminium
Pigments non leafing

D50-value approx. µm	Applications	Outstanding Features
75		narrow particle size distribution, coarse grades show high sparkle effekt
56		
47		
34		
31		
29		
27		
24		
24		silverdollars standard; narrow particle size distribution
22		
18		
18		
15		
18		thick silverdollars premium; very narrow particle size distribution; strong and dark flop recommended for circulation resistance
13		
8		
		thin silverdollar; superb hiding power + liquid metal effect
15		

3 Vacuum metallized pigments (VMPs)

DECOMET 1000 **Economy series**

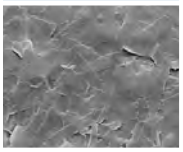
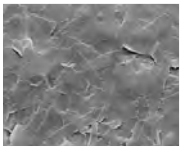
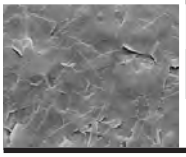
DECOMET 2000 **Standard series**

DECOMET 3000 **Premium series**

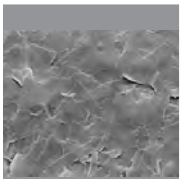
DECOMET 4000
DECOMET 5000 **High end series**

white appearance

dark + metallic appearance

Morphology	Product Denomination	non-volatile content %	Solvent
	Decomet 2687 / 30	30 ± 0,5	methoxypropyl acetate/white spirit
	Decomet 1008 / 10	10 ± 0,5	methoxypropyl acetate
	Decomet 2008 / 10	10 ± 0,5	methoxypropyl acetate
	Decomet 2108 / 10	10 ± 0,5	methoxypropyl acetate
	Decomet 3008 / 10	10 ± 0,5	methoxypropyl acetate
	Decomet 3108 / 10	10 ± 0,5	methoxypropyl acetate
	Decomet 4008 / 10	10 ± 0,5	methoxypropyl acetate
	Decomet 5008 / 10	10 ± 0,5	methoxypropyl acetate

+ Slurries including different solvents (ethyl acetate & isopropyl acetate) are available upon request

Morphology	Product Denomination	non-volatile content %	Solvent
	Decomet 1050 / 10	10 ± 0,5	water
	Decomet 2057 / 10	10 ± 0,5	tripropylenglycolmethylether

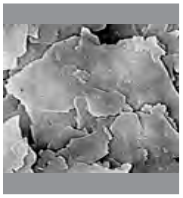
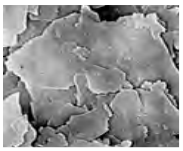
D50-value approx. µm	Applications	Outstanding Features
10 - 11		leafing grade; outstanding mirror effect
12 - 15		light metallic; white appearance
12 - 15		chrome like metallic effect
10 - 11		
11 - 14		dark metallic, good opacity; stainless steel
10 - 11		
11 - 14		very dark metallic, superb opacity; platinum
11 - 14		

D50-value approx. µm	Applications	Outstanding Features
12 - 15		passivated for waterborne systems not recommended for rim coating
12 - 15		excellent humidity resistance; perfect intercoat adhesion recommended for rim and glass coatings

4 Waterborne systems non leafing

AQUAMET NPW phosphor organic treated

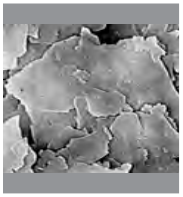
AQUAMET WPO phosphor organic treated (modified)

Morphology	Product Denomination	non-volatile content %	Solvent
	Aquamet NPW / 2600	60 ± 2	water
	Aquamet NPW / 1500	60 ± 2	water
	Aquamet NPW / 1700	60 ± 2	water
	Aquamet NPW / 2900	60 ± 2	water
	Aquamet NPW / 3200	60 ± 2	water
	Aquamet NPW / 3400	60 ± 2	water
	Aquamet NPW / 6200	60 ± 2	water
	Aquamet NPW / 6400	60 ± 2	water
	Aquamet NPW / 6600	60 ± 2	water
	Aquamet NPW / 6900	60 ± 2	water
			
	Aquamet WPO / 2600	60 ± 2	water
	Aquamet WPO / 3200 / 65	65 ± 2	water
	Aquamet WPO / 3400 / 70	65 ± 2	water

D50-value µm	Applications	Outstanding Features
24		no VOC content; specially recommended for **mono-coat systems**
22		
18		
11		
56		
34		
24		
22		
18		
15		
24		no VOC content; good intercoat adhesion; specially recommended for **two-coat systems**
56		
34		

Aluminium Pigments non leafing

AQUAMET CP-BG SiO_2 encapsulated

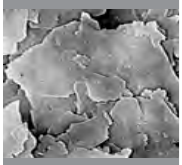
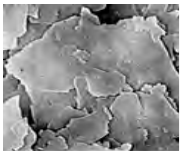
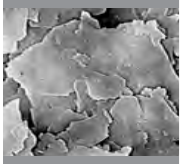
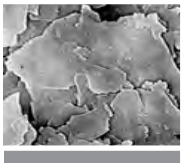
Morphology	Product Denomination	non-volatile content %	Solvent
	Aquamet CP-BG / 2600	60 ± 2	butyl glycol
	Aquamet CP-BG / 1500	60 ± 2	butyl glycol
	Aquamet CP-BG / 1700	60 ± 2	butyl glycol
	Aquamet CP-BG / 2900 / 50	50 ± 2	butyl glycol
	Aquamet CP-BG / 3200	60 ± 2	butyl glycol
	Aquamet CP-BG / 3400	60 ± 2	butyl glycol
	Aquamet CP-BG / 6600	60 ± 2	butyl glycol
	Aquamet CP-BG / 6900	60 ± 2	butyl glycol
	Aquamet CP-BG / 8500 / 50	50 ± 2	butyl glycol
	Aquamet CP-BG / 7600	60 ± 2	butyl glycol

D50-value µm	Applications	Outstanding Features
24		good circulation resistance; non-conductive setup offers excellent chemical resistance; recommended for plastic coatings
22		
18		
11		
56		
34		
18		
15		
15		
13		

Aluminium
Pigments non leafing

5 Powder Coatings

All Powdal grades are recommended for dry blend as well as bonding applications.
For extrusion we recommend Grandal pellets (see 6.3).

Morphology	Product Denomination	Stabilization	D50-value
	leafing		
	Powdal 70		20
	Powdal 110		13
	Powdal 130		10
	Powdal 170		6
	Powdal 170 XB		6
	non leafing		
	Powdal 310 n.l.		75
	Powdal 320 n.l.		54
	Powdal 340 n.l.		34
	Powdal 2600	SiO_2	24
	Powdal 2650	SiO_2	20
	Powdal 1500	SiO_2	22
	Powdal 1700	SiO_2	18
	Powdal 2900	SiO_2	11
	Powdal 3100	SiO_2	75
	Powdal 3200-01	SiO_2	54
	Powdal 3250-01	SiO_2	48
	Powdal 3400-01	SiO_2	34
	Powdal 6600	SiO_2	18
	Powdal 6900	SiO_2	15
	Powdal 8500	SiO_2	15
	Powdal 8500 HC	SiO_2	15
			
	Powdal 2600 XT	SiO_2	24
	Powdal 3100 XT	SiO_2	75
	Powdal 3200 XT	SiO_2	54
	Powdal 3250 XT	SiO_2	48
	Powdal 3400 XT	SiO_2	34
	Powdal 6600 XT	SiO_2	18

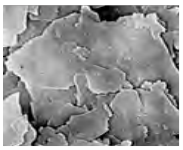
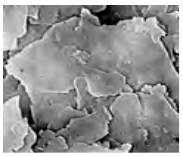
Powdal leafing	**Untreated** – leafing
Powdal non leafing	**Untreated** – Economy series
Powdal nl SiO_2	**Silica encapsulated** – Standard series
Powdal nl HC	**Silica encapsulated** – High Chrome Effect
Powdal nl XT	**Silica encapsulated** – Premium series

Applications approx. µm	Outstanding Features	
	bright and chrome-like effect apperance combined with excellent hiding power	
	best available hiding power	
	high sparkle series, only for interior applications	
	high cost-effectiveness, only for interior applications	
	excellent chemical resistance and metallic appearance	
	superior metallic effect without fingerprints	
	chrome-like effect with strongly improved fingerprint resistance	
	fulfills GSB standard (mortar resistant)	excellent chemical resistance especially for exterior usage

6 Specialities

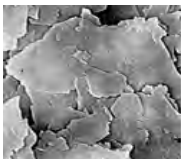
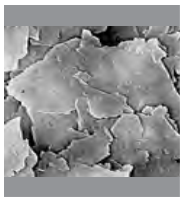
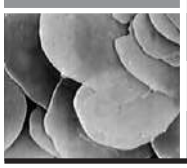
6.1 Coil / Can Coatings

ALUCOIL Aluminiumpigments specially for coil and can coatings. Quality control is done in a coil-coating system ensuring perfect batch to batch consistency.

Morphology	Product Denomination	non-volatile content %	Solvent
	Alucoil 2600 CC	65	white spirit / aromatics
	Alucoil 1700 CC	65	white spirit / aromatics
	Alucoil 2900 CC	65	white spirit / aromatics
	Alucoil 3200 CC	70	white spirit / aromatics
	Alucoil 3400 CC	70	white spirit / aromatics
	Alucoil 6600 CC	70	white spirit / aromatics
	Alucoil 7800 CC	50	white spirit / aromatics
	Alucoil 8500 CC	55	white spirit / aromatics
	Polymer Coated		
			
	Alucoil XT 1700 CC	50	white spirit / aromatics
	Alucoil XT 3200 CC	55	white spirit / aromatics
	Alucoil XT 3400 CC	55	white spirit / aromatics
	Alucoil XT 7600 CC	55	white spirit / aromatics
	Alucoil XT 8500 CC	50	white spirit / aromatics

6.3 Aluminium pellets

GRANDAL Aluminium pellets based on aldehyde resin

Morphology	Product Denomination	metal content %	D50-value µm
	leafing		
	Grandal 770	ca. 95	20
	Grandal 2140	ca. 95	13
	Grandal 170	ca. 95	6
	non leafing		
	Grandal 2600	ca. 95	24
	Grandal 1050	ca. 95	22
	Grandal 1700	ca. 95	18
	Grandal 2900	ca. 95	11
	Grandal 6600	ca. 95	18
	Grandal 6900	ca. 95	15

Specialities

D50-value µm	Applications	Outstanding Features
24		**Standard series –** not encapsulated
18		
11		
50		
34		
18		
8		
15		
18		**Premium series –** excellent chemical resistance due to its polymer encapsulation
56		
34		
13		
15		

Applications	Outstanding Features
	solventfree easy to dose
	
	
	
	
	
	
	
	
	

7 Goldbronze Pigments

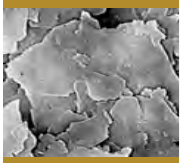
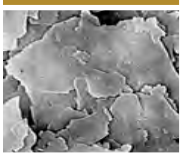
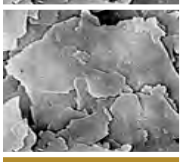
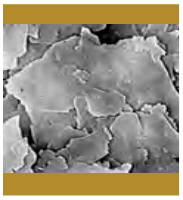
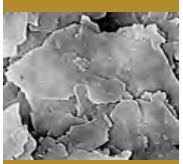
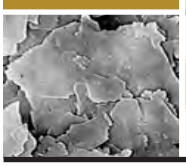
Powders + Waterborne Pastes

LUMINOR
UNICOAT **Powders** – not passivated
GOLDFLITTER

CONSTANT **Powders** – SiO_2 encapsulated

AQUADOR **Pastes** – stabilized version for waterborne systems

GRANDOR **Pellet version**

Morphology	Product Denomination	metal content %	D50-value µm
	Luminor 2210	100	50
	Luminor 2250	100	35
	Luminor 2550	100	35
	Luminor 2280	100	20
	Luminor 2580	100	20
	Luminor 2350	100	16
	Unicoat 3050	100	11,5
	Unicoat 3850	100	6
			
	Grandor 426 n.l.	95	9
	Constant 2210 / N	100	45
	Constant 2250 / N	100	33
	Constant 2280 / N	100	28
	Constant 4117 / N	100	11
	Aquador 2250	70	35
	Aquador 2550	70	35
	Aquador 2580	70	20
	Aquador 2350	70	16
	Aquador 3050	70	11,5
	Aquador 4350	70	6
	Goldflitter 200	100	200
	Goldflitter 1000	100	1000
	Goldflitter Constant 200	100	200

all powders are available in paste and granule form as well

Standard Colors: Rich Gold: **RG;** Rich Pale Gold: **RPG;** Pale Gold: **PG;** Copper: **CO**
Special Colors: English Green: **EG;** Citron: **CT;** Gold Color: **GC;** Ducat Gold: **DG;** Fire Red: **FR;** Maron: **MR**

Goldbronze Pigments

Shades	Applications	Outstanding Features
RG; RPG; PG; CO; DG		brilliant deep shades
RG; RPG; PG; CO; EG; CT; GC; DG; FR		
RG; RPG; PG; CO		
RG; RPG; PG; CO; DG		
RG; RPG; PG; CO; EG; CT; GC; DG; FR; MR		
RG; RPG; PG; CO; DG		
RG; RPG; PG		excellent hiding power
RG; RPG; PG; CO		
		special non leafing setup
RG; RPG; PG; DG		
RG; RPG; PG; CO		silica encapsulated high chemical resistance
RG; RPG; PG; CO		
RG; RPG; PG; CO; EG; CT; DG; FR		
RG; RPG; PG; CO		
RG; RPG; PG; CO; EG; CT; GC; DG; FR		stabilized leaving pastes for waterborne systems
RG; RPG; PG; CO		
RG; RPG; PG; CO; EG; CT; GC; DG; FR; MR		
RG; RPG; PG; CO; DG		
RG; RPG; PG		
RG; RPG; PG		
RG; PG; CO		coarse goldflitter for high sparkle effects
RG; PG; CO		
RG; PG; CO		

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Printed in Germany. CS 02/12



Headquarters and facility for aluminium and goldbronze metallic pigments in Barnsdorf and Rothenbruck, Germany

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