



**NDF**

Non-Degrading Flakes

## NDF – Non-Degrading Flakes

### Description & General Information

- **NDF** pigments are designed specifically to provide increased shear stability versus traditional Cornflake and Silver Dollar flakes while providing excellent brightness, flop, sparkle and color stability.
- **NDF** pigments are suitable for conventional and high solids paint systems. On request and based on the application, we can offer stabilized pigments for water-based systems.
- **NDF's** are more stable in circulation systems than conventional Aluminum pigments.
- **NDF's** are thicker than traditional silver dollar and cornflake pigments.
- **NDF's** come in a wide variety of particle sizes (D50 of 9 µm up to 20 µm) and are supplied in paste form.
- ECKART America has more than 20 years of experience in manufacturing NDF pigments.

### Application Areas

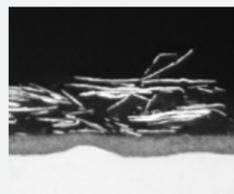
NDF's are used for a wide field of applications, such as:

- Automotive OEM & Accessories
- Coil coatings
- Wheel rims
- Packaging - exterior and interior food can coatings
- Graphic Arts applications - flexographic and gravure printing

Conventional Flake

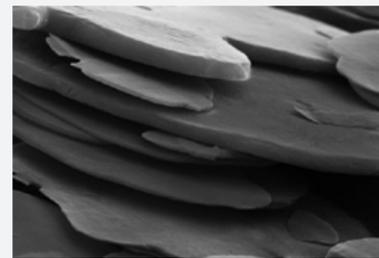


SEM

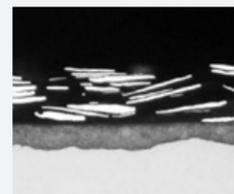


cross section polish

NDF



SEM



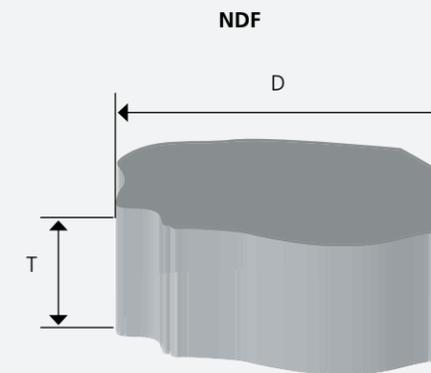
cross section polish

## NDF – Non-Degrading Flakes

### Pigment Characteristics / Morphologies (Aspect Ratio)

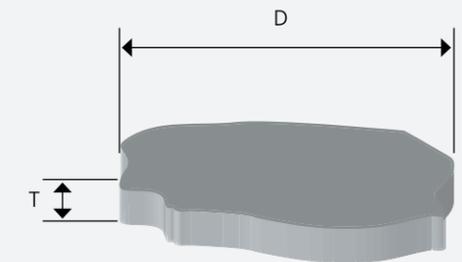
- **NDF's** pigments provide improved shear stability due to increased thickness and edge uniformity.
- Improved shear stability means the pigment will not lose brightness and flop during high stress applications, e.g. in automotive recirculation systems / coil applications.

#### Aspect Ratio



Better shear stability

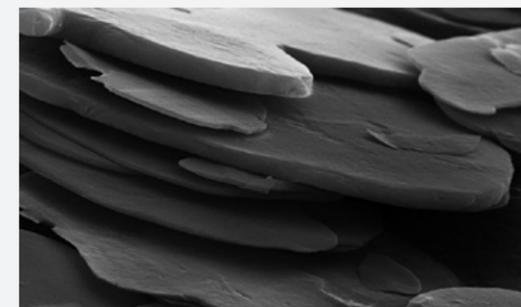
Silver Dollar



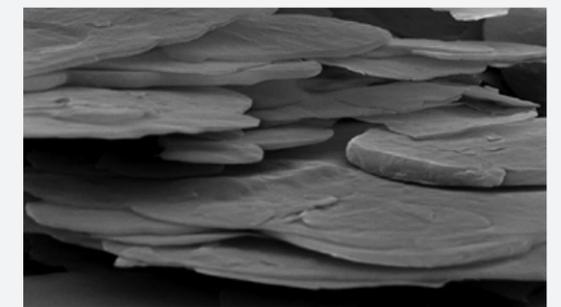
Better Coverage and Hiding power

#### SEM pictures:

NDF



Silver Dollar



# NDF – Non-Degrading Flakes

## Shear Stability

**Shear Stability** is described as the property of a pigment flake to retain structure, color, brightness and flop when exposed to a high shear situation.

When pigments are exposed to high shear forces, such as in paint recirculation systems, they can experience physical damage to the flake perimeter, and in worst cases actual fractures to the flakes. This damage will result in an appearance change which is normally observed as a decrease in color, brightness and flop.

Shear stability is a concern in the Automotive and Coil Coatings Industries, and other applications where liquid paint is exposed to high shear.

**Shear Stability** is influenced by several factors:

- Pigment Structure / Morphology
- Paint System – high solids vs. low solids and solventborne vs. waterborne
- Application System – Pumps, paint recirculation, roller applicator, high speed 'bell' cup

In order to determine pigment stability properties, Laboratory Test Methods are used to simulate the shear in Automotive OEM paint recirculation systems, e.g., Waring Blender Test.

**NDF pigments offer the solution: Superior shear stability, unique color position with excellent brightness, color stability and flop:**

# NDF

## NDF – Standard Product Portfolio

NDF	Visual effect	D10	D50	D90	NVM
NDF 120	fine	6	12	20	70
NDF 130	medium – fine	6	13	23	70
NDF 150	medium	8	15	24	70
NDF 170	medium	9	17	29	80
NDF 200	medium	11	20	30	80

Comparison Silver Dollar – NDF in coating: Shear stability

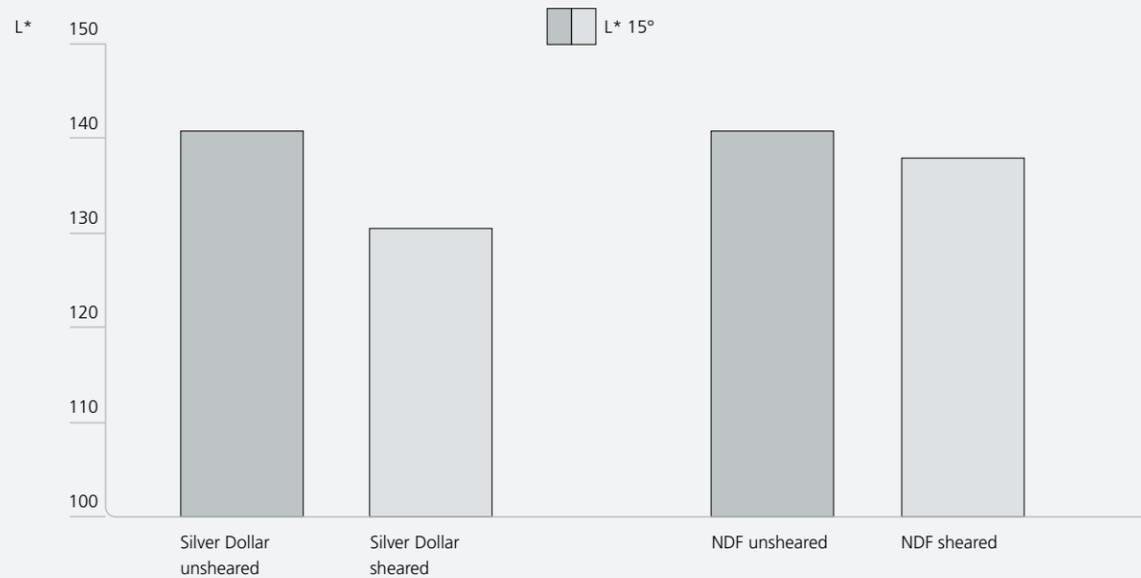


Illustration after Waring Blender test: Deviation in L\* (15°) between "unsheared" and "sheared" paint application. Measured with Spectrophotometer (e.g. BYK-mac).



## NDF 2000

## NDF 3000

### NDF 2000 – Enhanced Product Portfolio

- Brighter metallic effect
- Increased flop / travel
- Comparable tint strength (to Standard Product Portfolio)

NDF	Visual effect	D10	D50	D90	NVM
NDF 2120	fine	7	12	20	70
NDF 2140	medium – fine	9	14	22	70
NDF 2180	medium	11	19	30	75

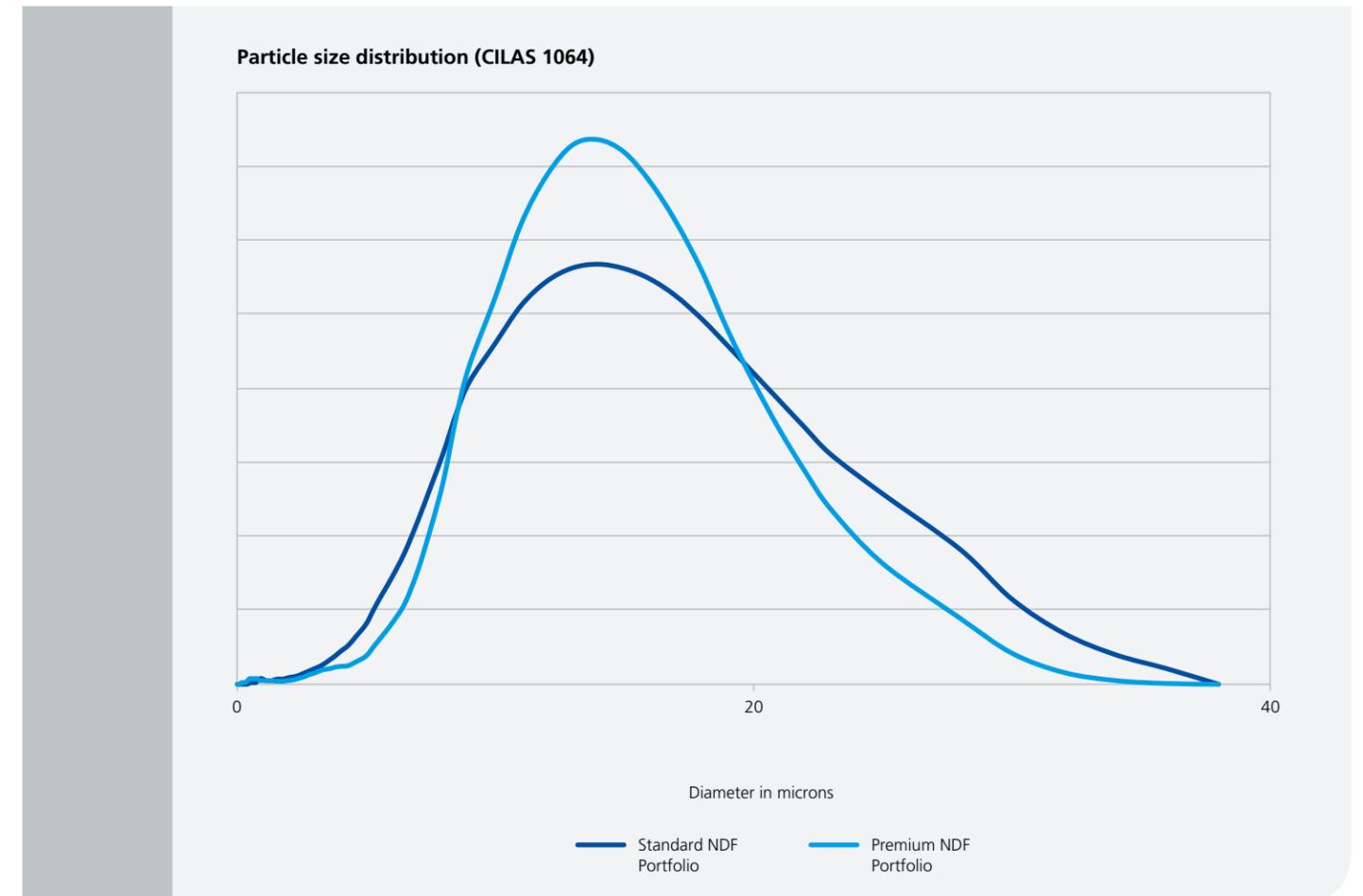
### NDF 3000 – Premium Product Portfolio

- Narrowed particle size distribution
- Brighter metallic effect
- Increased flop / travel
- Higher color purity
- Comparable tint strength (to Standard Product Portfolio)

NDF	Visual effect	D10	D50	D90	NVM
NDF 3090	fine	5	9	14	70
NDF 3125	fine	8	13	20	70
NDF 3150	medium – fine	10	16	24	75

## NDF – Non-Degrading Flakes

### Particle size distribution





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