



## Technical Data

### Heat Stable Yellow - CathayCoat™ ZF15

Micronized Synthetic Heat Stable Yellows made with Zinc Oxide and Iron Oxide Pigments from Cathay Industries are high-quality, heat-stable yellow colored pigments suitable for a wide range of demanding applications. Typical applications include plastics, powder coatings, high-bake temperature industrial finishes, coil coatings, military coatings, specialty coatings, ceramics, and roofing granules. Our micronized Heat Stable Yellow is to offer easy dispersion with high-speed impeller (Cowles type) milling equipment or single & twin screw extruders.

As with all Cathay Industries products the zinc ferrite pigments are produced to strict quality tolerances and yield reliable performance properties. Our zinc ferrite pigments are stable to temperatures up to 400°C (750°F) or higher in some applications.

#### TYPICAL PROPERTIES

| Properties   | Units             | Specifications                   | Test Methods                        |
|--|-------------------|----------------------------------|-------------------------------------|
| Appearance   |                   | Yellow Powder                    |                                     |
| Chemical Composition                                 |                   | ZnFe <sub>2</sub> O <sub>4</sub> |                                     |
| Particle Shape                                       |                   | Spherical                        |                                     |
| Pigment Index  |                   | Yellow 119                       |                                     |
| Color Index  |                   | 77496                            |                                     |
| Tapped Density                                       | g/cm <sup>3</sup> | 0.8 – 1.1                        | ISO 787-11                          |
| Density  | g/cm <sup>3</sup> | 5.0                              | ISO 787-10                          |
| Iron Oxide Content as Fe <sub>3</sub> O <sub>4</sub> | %                 | ≥65                              | BS 1014                             |
| Water Soluble Matter                                 | %                 | ≤0.5                             | ISO 787-3                           |
| Sieve Residue 45 micron mesh                         | %                 | ≤0.1                             | ISO 787-7                           |
| Moisture (Wt. % @ 110°C)                             | %                 | ≤1.0                             | ISO 787-2                           |
| Typical pH   |                   | 5.0 – 8.0                        | ISO 787-9                           |
| Avg. Particle Size                                   | Microns           | 0.68                             | d50 from particle size distribution |
| Oil Absorption                                       | g/100g            | 15 – 25                          | ISO 787-5                           |
| Hegman Fineness                                      |                   | 2.0+                             | ASTM D 1210                         |



## Technical Data

### Heat Stable Yellow - CathayCoat™ ZF15

#### COLOR VALUES

|   | Min  | Max  | Test Method |
|---|------|------|-------------|
| <i>Mass tone Shade</i>  |      |      |             |
| dE  | Nil  | 1.0  | ISO 7724-2  |
| dL  | -0.8 | +0.8 | ISO 7724-2  |
| da  | -0.8 | +0.8 | ISO 7724-2  |
| db  | -0.8 | +0.8 | ISO 7724-2  |
| <i>Tint tone Shade - Reduction with TiO<sub>2</sub> (1:4)</i> |      |      |             |
| dE  | Nil  | 1.0  | ISO 7724-2  |
| dL  | -0.8 | +0.8 | ISO 7724-2  |
| da  | -0.8 | +0.8 | ISO 7724-2  |
| db  | -0.8 | +0.8 | ISO 7724-2  |
| Tinting Strength  | 95%  | 105% | ISO 8787-1  |

[www.cathayindustries.com](http://www.cathayindustries.com)



# **COLOR PERFECTION**

## **HIGH PERFORMANCE INORGANIC COLOR PIGMENTS**







Iron oxides are CATHAY INDUSTRIES' core business. As the third largest iron oxide manufacturer in the world, CATHAY INDUSTRIES provides a wide range of iron oxide pigments from economical grades for construction applications, to high-quality CATHAYCOAT™ for top coating, and the highest-purity CATHAYPURE™ for cosmetics.

CATHAYCOAT™ is CATHAY INDUSTRIES' premium range of iron oxides. It's made for top coating and fine-quality products like paints, plastics and paper. CATHAYCOAT™ can be divided into four subcategories, from the most-premium micronized "A" grades and LV grade, to standard "S" grades, and more economical "C" grades and Primer grades.

### Micronized A Grades

CATHAYCOAT™ Micronized A-grade iron oxides are high-quality pigments tailor-made for top coatings that have premium requirements. With its extra well dispersing properties, it can be used directly for high-speed dispersing without further milling. Therefore it saves time, energy and labor during the production of paints, dispersions and other final products.

### Standard Grades



CATHAYCOAT™ S-grade ironoxides are a range of high-quality pigments with attractive prices for paints, plastics, paper and dispersions. Extra milling or dispersant additives can be added to customize and improve the final product.

### Low Viscosity Yellow

CATHAYCOAT™ "LV" grade is a unique yellow iron oxide pigment that provides extra-low viscosity in the final dispersion, even at the highest pigment loading.

### Economical C Grades

CATHAYCOAT™ C-grade iron oxide is an economical pigment range for coating applications. With our custom specification manufacturing and our advanced, environmentally safe production, this range of iron oxide products provides another choice for excellent cost-performance ratio.

### Primer Grades

Primer-grade iron oxides are a range of red pigments that provide high hiding power, easy dispersion and high tinting strength for primer paint applications.

### Heat Stable

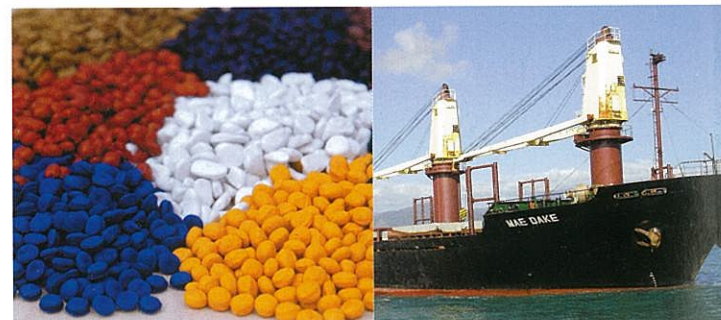
CATHAY INDUSTRIES produces two mixed metal oxide types, Manganese Ferrite and Zinc Ferrite. Both are made with high-temperature calcination and are heat stable for use in applications with temperature changes. These products are offered under the name of CATHAYCOAT™.

### Chrome Oxide

Chrome Oxide Green pigments from CATHAY INDUSTRIES are a range of high-quality inorganic green pigments. They are produced to strict quality standard and offer reliable performance, including:

- outstanding light-fastness
- high opacity
- excellent chemical resistance
- exterior durability

Chrome Oxide Green pigments must not be confused with the potentially toxic "Chrome Green," which is a blend of chrome yellow and iron blue that CATHAY INDUSTRIES does not produce.



### Umber

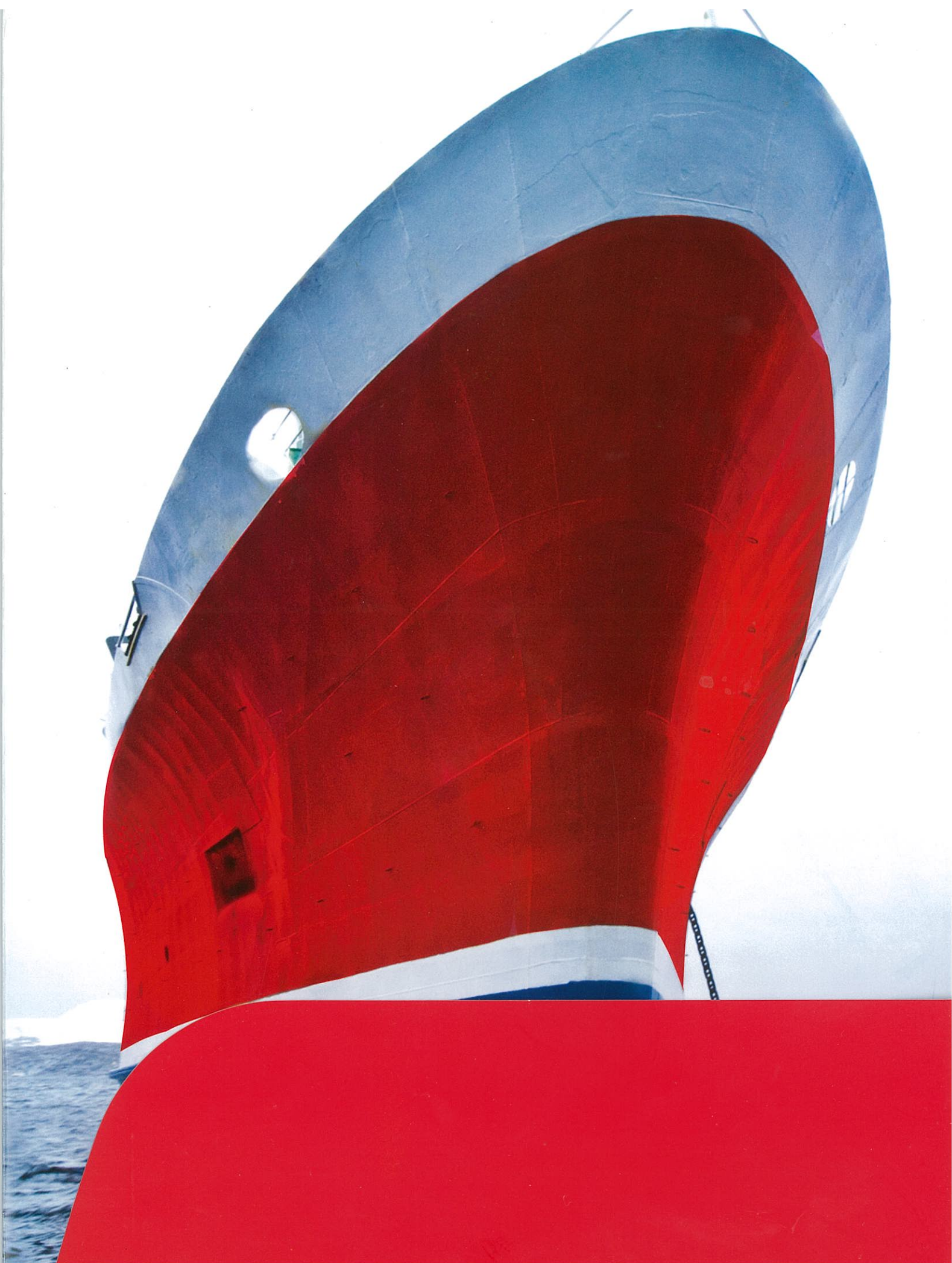
CATHAY offers raw and burnt umber pigments of uncompromising quality. These pigments have semi-transparent properties making them ideal for use in wood and furniture stains.

Raw Umber is excellent brown pigments and popular in the stain industry due to their semi-transparency. Though they are not heat stable, UR81 can be used to produce many warm gray tones. It is also used extensively by the colorant houses to darken a color without seriously affecting its chromaticity.

Burnt Umbers offer the best value in brown pigments. These materials are in high demand in the stain industry because of their semi-transparency. Burnt Umbers have a reddish undertone and exhibit good heat stability.











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## CATHAYCOAT™ MICRONIZED A GRADE

Colors Represent Mass Tone and Tint Tone (Reduction with  $\text{TiO}_2$  1:4)

## IRON OXIDE RED

|           | RA11A | RA11 | RA12A | RA12 | RA13A | RA13 | RA14 |
|-----------|-------|------|-------|------|-------|------|------|
| MASS TONE |       |      |       |      |       |      |      |
| TINT TONE |       |      |       |      |       |      |      |
|           | RA14B | RA15 | RA15B | RA16 | RA16B | RA18 |      |
| MASS TONE |       |      |       |      |       |      |      |
| TINT TONE |       |      |       |      |       |      |      |

## IRON OXIDE YELLOW

|           | YA21E | YA22E | YA22B | YA23E | YA50E |
|-----------|-------|-------|-------|-------|-------|
| MASS TONE |       |       |       |       |       |
| TINT TONE |       |       |       |       |       |

## LOW VISCOSITY IRON OXIDE YELLOW

|           | YA21LV | YA22LV | YA23LV |
|-----------|--------|--------|--------|
| MASS TONE |        |        |        |
| TINT TONE |        |        |        |

## IRON OXIDE BLACK

|           | BA30 | BA30B | BA31 | BA33 |
|-----------|------|-------|------|------|
| MASS TONE |      |       |      |      |
| TINT TONE |      |       |      |      |



## Typical Physical Properties (Micronized A Grade)

| Product Code | Pigment Index | Chemical Composition | Purity, % (as Fe <sub>2</sub> O <sub>3</sub> ) | Oil Absorption (g/100g) | Density (g/cm <sup>3</sup> ) | Sieve Residue on 325 mesh (%) | Water Soluble Salts (%) | pH        | Moisture (%) | Hegman    | Particle Shape      | DE        | Tinting Strength (%) |
|--------------|---------------|----------------------|--|-------------------------|------------------------------|-------------------------------|-------------------------|-----------|--------------|-----------|---------------------|-----------|----------------------|
| Test Method  |               |                      | BS1014   | ISO 787-5               | ISO 787-10                   | ISO 787-7                     | ISO 787-3               | ISO 787-9 | ISO 787-2    | ASTMD1210 | Electron Micrograph | ISO7724-2 | ISO 8781-1           |

## IRON OXIDE RED

|       |        |                                |     |       |     |       |      |     |    |      |           |    |        |
|-------|--------|--------------------------------|-----|-------|-----|-------|------|-----|----|------|-----------|----|--------|
| RA11A | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Spherical | ≤1 | 95-105 |
| RA11  | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Spherical | ≤1 | 95-105 |
| RA12A | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Spherical | ≤1 | 95-105 |
| RA12  | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Spherical | ≤1 | 95-105 |
| RA13A | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Spherical | ≤1 | 95-105 |
| RA13  | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Spherical | ≤1 | 95-105 |
| RA14  | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Spherical | ≤1 | 95-105 |
| RA14B | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Spherical | ≤1 | 95-105 |
| RA15  | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Spherical | ≤1 | 95-105 |
| RA15B | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Spherical | ≤1 | 95-105 |
| RA16  | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Spherical | ≤1 | 95-105 |
| RA16B | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Spherical | ≤1 | 95-105 |
| RA18  | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Spherical | ≤1 | 95-105 |

## IRON OXIDE YELLOW

|       |       |   |     |       |     |       |      |     |    |      |          |    |        |
|-------|-------|---|-----|-------|-----|-------|------|-----|----|------|----------|----|--------|
| YA21E | PY 42 | Fe <sub>2</sub> O <sub>3</sub> • H <sub>2</sub> O | 86+ | 28-40 | 4.1 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Acicular | ≤1 | 95-105 |
| YA22E | PY 42 | Fe <sub>2</sub> O <sub>3</sub> • H <sub>2</sub> O | 86+ | 28-40 | 4.1 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Acicular | ≤1 | 95-105 |
| YA22B | PY 42 | Fe <sub>2</sub> O <sub>3</sub> • H <sub>2</sub> O | 86+ | 28-40 | 4.1 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Acicular | ≤1 | 95-105 |
| YA23E | PY 42 | Fe <sub>2</sub> O <sub>3</sub> • H <sub>2</sub> O | 86+ | 28-40 | 4.1 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Acicular | ≤1 | 95-105 |
| YA50E | PY 42 | Fe <sub>2</sub> O <sub>3</sub> • H <sub>2</sub> O | 86+ | 28-40 | 4.1 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Acicular | ≤1 | 95-105 |

## LOW VISCOSITY IRON OXIDE YELLOW

|        |       |   |     |       |     |       |      |     |    |      |          |    |        |
|--------|-------|---|-----|-------|-----|-------|------|-----|----|------|----------|----|--------|
| YA21LV | PY 42 | Fe <sub>2</sub> O <sub>3</sub> • H <sub>2</sub> O | 86+ | 28-40 | 4.1 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Acicular | ≤1 | 95-105 |
| YA22LV | PY 42 | Fe <sub>2</sub> O <sub>3</sub> • H <sub>2</sub> O | 86+ | 28-40 | 4.1 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Acicular | ≤1 | 95-105 |
| YA23LV | PY 42 | Fe <sub>2</sub> O <sub>3</sub> • H <sub>2</sub> O | 86+ | 28-40 | 4.1 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Acicular | ≤1 | 95-105 |

## IRON OXIDE BLACK

|       |        |                                |     |       |     |       |      |     |    |      |       |    |        |
|-------|--------|--------------------------------|-----|-------|-----|-------|------|-----|----|------|-------|----|--------|
| BA30  | PBk 11 | Fe <sub>3</sub> O <sub>4</sub> | 95+ | 15-25 | 5.0 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Cubic | ≤1 | 95-105 |
| BA30B | PBk 11 | Fe <sub>3</sub> O <sub>4</sub> | 95+ | 15-25 | 5.0 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Cubic | ≤1 | 95-105 |
| BA31  | PBk 11 | Fe <sub>3</sub> O <sub>4</sub> | 95+ | 15-25 | 5.0 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Cubic | ≤1 | 95-105 |
| BA33  | PBk 11 | Fe <sub>3</sub> O <sub>4</sub> | 95+ | 15-25 | 5.0 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Cubic | ≤1 | 95-105 |

The color chips represented here are as accurate as the printing process will allow, it may be slightly different from actual shades. This is for your reference ONLY. Please pay attention to the samples we send to you.



**CATHAYCOAT™ Standard S Grade**Colors Represent Mass Tone and Tint Tone (Reduction with  $\text{TiO}_2$  1:4)**IRON OXIDE RED**

|           | RS10 | RS11 | RS13 | RS13B | RS14 | RS16 | RS18 |
|-----------|------|------|------|-------|------|------|------|
| MASS TONE |      |      |      |       |      |      |      |
| TINT TONE |      |      |      |       |      |      |      |

**IRON OXIDE YELLOW**

|           | YS21 | YS22E | YS22B | YS23 |
|-----------|------|-------|-------|------|
| MASS TONE |      |       |       |      |
| TINT TONE |      |       |       |      |

**IRON OXIDE BROWN**

|           | BRS80H | BRS82 | BRS86 | BRS88 |
|-----------|--------|-------|-------|-------|
| MASS TONE |        |       |       |       |
| TINT TONE |        |       |       |       |

**IRON OXIDE BLACK**

|           | BB30 | BB33 |
|-----------|------|------|
| MASS TONE |      |      |
| TINT TONE |      |      |

**IRON OXIDE ORANGE**

|           | OS66 | OS66 |
|-----------|------|------|
| MASS TONE |      |      |
| TINT TONE |      |      |

## Typical Physical Properties (Standard S Grade)

| Product Code | Pigment Index | Chemical Composition | Purity, % (as Fe <sub>2</sub> O <sub>3</sub> ) | Oil Absorption (g/100g) | Density (g/cm <sup>3</sup> ) | Sieve Residue on 325 mesh (%) | Water Soluble Salts (%) | pH        | Moisture (%) | Hegman     | Particle Shape      | DE         | Tinting Strength (%) |
|--------------|---------------|----------------------|--|-------------------------|------------------------------|-------------------------------|-------------------------|-----------|--------------|------------|---------------------|------------|----------------------|
| Test Method  |               |                      | BS1014   | ISO 787-5               | ISO 787-10                   | ISO 787-7                     | ISO 787-3               | ISO 787-9 | ISO 787-2    | ASTM D1210 | Electron Micrograph | ISO 7724-2 | ISO 8781-1           |

## IRON OXIDE RED

|       |        |                                |     |       |     |      |      |     |    |      |           |    |        |
|-------|--------|--------------------------------|-----|-------|-----|------|------|-----|----|------|-----------|----|--------|
| RS10  | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.1 | ≤0.3 | 5-8 | ≤1 | 3.0+ | Spherical | ≤1 | 95-105 |
| RS11  | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.1 | ≤0.3 | 5-8 | ≤1 | 3.0+ | Spherical | ≤1 | 95-105 |
| RS13  | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.1 | ≤0.3 | 5-8 | ≤1 | 3.0+ | Spherical | ≤1 | 95-105 |
| RS13B | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.1 | ≤0.3 | 5-8 | ≤1 | 3.0+ | Spherical | ≤1 | 95-105 |
| RS14  | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.1 | ≤0.3 | 5-8 | ≤1 | 3.0+ | Spherical | ≤1 | 95-105 |
| RS16  | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.1 | ≤0.3 | 5-8 | ≤1 | 3.0+ | Spherical | ≤1 | 95-105 |
| RS18  | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.1 | ≤0.3 | 5-8 | ≤1 | 3.0+ | Spherical | ≤1 | 95-105 |

## IRON OXIDE YELLOW

|       |       |  |     |       |     |      |      |     |    |      |          |    |        |
|-------|-------|--|-----|-------|-----|------|------|-----|----|------|----------|----|--------|
| YS21  | PY 42 | Fe <sub>2</sub> O <sub>3</sub> •H <sub>2</sub> O | 86+ | 28-40 | 4.1 | ≤0.1 | ≤0.3 | 5-8 | ≤1 | 3.0+ | Acicular | ≤1 | 95-105 |
| YS22E | PY 42 | Fe <sub>2</sub> O <sub>3</sub> •H <sub>2</sub> O | 86+ | 28-40 | 4.1 | ≤0.1 | ≤0.3 | 5-8 | ≤1 | 3.0+ | Acicular | ≤1 | 95-105 |
| YS22B | PY 42 | Fe <sub>2</sub> O <sub>3</sub> •H <sub>2</sub> O | 86+ | 28-40 | 4.1 | ≤0.1 | ≤0.3 | 5-8 | ≤1 | 3.0+ | Acicular | ≤1 | 95-105 |
| YS23  | PY 42 | Fe <sub>2</sub> O <sub>3</sub> •H <sub>2</sub> O | 86+ | 28-40 | 4.1 | ≤0.1 | ≤0.3 | 5-8 | ≤1 | 3.0+ | Acicular | ≤1 | 95-105 |

## IRON OXIDE BROWN

|        |         |         |     |       |         |       |      |     |    |     |           |    |        |
|--------|---------|---------|-----|-------|---------|-------|------|-----|----|-----|-----------|----|--------|
| BRS80H | Mixture | Mixture | 88+ | 20-35 | 4.1-4.9 | ≤0.25 | ≤0.3 | 5-8 | ≤1 | --- | Irregular | ≤1 | 95-105 |
| BRS82  | Mixture | Mixture | 88+ | 20-35 | 4.1-4.9 | ≤0.25 | ≤0.3 | 5-8 | ≤1 | --- | Irregular | ≤1 | 95-105 |
| BRS86  | Mixture | Mixture | 88+ | 20-35 | 4.1-4.9 | ≤0.25 | ≤0.3 | 5-8 | ≤1 | --- | Irregular | ≤1 | 95-105 |
| BRS88  | Mixture | Mixture | 88+ | 20-35 | 4.1-4.9 | ≤0.25 | ≤0.3 | 5-8 | ≤1 | --- | Irregular | ≤1 | 95-105 |

## IRON OXIDE BLACK

|      |        |                                |     |       |     |       |      |     |    |     |       |    |        |
|------|--------|--------------------------------|-----|-------|-----|-------|------|-----|----|-----|-------|----|--------|
| BB30 | PBk 11 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | --- | Cubic | ≤1 | 95-105 |
| BB33 | PBk 11 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | --- | Cubic | ≤1 | 95-105 |

## IRON OXIDE ORANGE

|      |         |         |     |       |         |       |      |     |    |     |           |    |        |
|------|---------|---------|-----|-------|---------|-------|------|-----|----|-----|-----------|----|--------|
| OS66 | Mixture | Mixture | 86+ | 20-35 | 4.1-4.9 | ≤0.25 | ≤0.3 | 5-8 | ≤1 | --- | Irregular | ≤1 | 95-105 |
|------|---------|---------|-----|-------|---------|-------|------|-----|----|-----|-----------|----|--------|

The color chips represented here are as accurate as the printing process will allow, it may be slightly different from actual shades. This is for your reference ONLY. Please pay attention to the samples we send to you.



## C AND PRIMER GRADES

Colors Represent Mass Tone and Tint Tone (Reduction with  $\text{TiO}_2$  1:4)

## C GRADE

## IRON OXIDE RED

|           | RC11 | RC13 | RC14 |
|-----------|------|------|------|
| MASS TONE |      |      |      |
| TINT TONE |      |      |      |

## IRON OXIDE YELLOW

|           | YC22B | YC23B | YC23 |
|-----------|-------|-------|------|
| MASS TONE |       |       |      |
| TINT TONE |       |       |      |

## IRON OXIDE ORANGE

|           | OC66 |
|-----------|------|
| MASS TONE |      |
| TINT TONE |      |

## IRON OXIDE BROWN

|           | BRC86 | BRC88 |
|-----------|-------|-------|
| MASS TONE |       |       |
| TINT TONE |       |       |

## PRIMER GRADE

## IRON OXIDE RED

|           | PR111 | PR222 | PR225 | PR180 | PR801 | PR802 |
|-----------|-------|-------|-------|-------|-------|-------|
| MASS TONE |       |       |       |       |       |       |
| TINT TONE |       |       |       |       |       |       |

## Typical Physical Properties (C and Primer Grades)

| Product Code | Pigment Index | Chemical Composition | Purity, % (as Fe <sub>2</sub> O <sub>3</sub> ) | Oil Absorption (g/100g) | Density (g/cm <sup>3</sup> ) | Sieve Residue on 325 mesh (%) | Water Soluble Salts (%) | pH        | Moisture (%) | Hegman     | Particle Shape      | DE         | Tinting Strength (%) |
|--------------|---------------|----------------------|--|-------------------------|------------------------------|-------------------------------|-------------------------|-----------|--------------|------------|---------------------|------------|----------------------|
| Test Method  |               |                      | BS1014   | ISO 787-5               | ISO 787-10                   | ISO 787-7                     | ISO 787-3               | ISO 787-9 | ISO 787-2    | ASTM D1210 | Electron Micrograph | ISO 7724-2 | ISO 8781-1           |

## C GRADE

## IRON OXIDE RED

|      |        |                                |     |       |     |       |      |     |    |     |           |    |        |
|------|--------|--------------------------------|-----|-------|-----|-------|------|-----|----|-----|-----------|----|--------|
| RC11 | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.25 | ≤0.3 | 5-8 | ≤1 | --- | Spherical | ≤1 | 95-105 |
| RC13 | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.25 | ≤0.3 | 5-8 | ≤1 | --- | Spherical | ≤1 | 95-105 |
| RC14 | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.25 | ≤0.3 | 5-8 | ≤1 | --- | Spherical | ≤1 | 95-105 |

## IRON OXIDE YELLOW

|       |       |   |     |       |     |       |      |     |    |     |          |    |        |
|-------|-------|---|-----|-------|-----|-------|------|-----|----|-----|----------|----|--------|
| YC22B | PY 42 | Fe <sub>2</sub> O <sub>3</sub> • H <sub>2</sub> O | 86+ | 28-40 | 5.0 | ≤0.25 | ≤0.3 | 5-8 | ≤1 | --- | Acicular | ≤1 | 95-105 |
| YC23B | PY 42 | Fe <sub>2</sub> O <sub>3</sub> • H <sub>2</sub> O | 86+ | 28-40 | 5.0 | ≤0.25 | ≤0.3 | 5-8 | ≤1 | --- | Acicular | ≤1 | 95-105 |
| YC23  | PY 42 | Fe <sub>2</sub> O <sub>3</sub> • H <sub>2</sub> O | 86+ | 28-40 | 5.0 | ≤0.25 | ≤0.3 | 5-8 | ≤1 | --- | Acicular | ≤1 | 95-105 |

## IRON OXIDE ORANGE

|      |         |         |     |       |         |       |      |     |    |     |           |    |        |
|------|---------|---------|-----|-------|---------|-------|------|-----|----|-----|-----------|----|--------|
| OC66 | Mixture | Mixture | 86+ | 20-35 | 4.1-4.9 | ≤0.25 | ≤0.5 | 5-8 | ≤1 | --- | Irregular | ≤1 | 95-105 |
|------|---------|---------|-----|-------|---------|-------|------|-----|----|-----|-----------|----|--------|

## IRON OXIDE BROWN

|       |         |         |     |       |         |       |      |     |    |     |           |    |        |
|-------|---------|---------|-----|-------|---------|-------|------|-----|----|-----|-----------|----|--------|
| BRC86 | Mixture | Mixture | 88+ | 20-35 | 4.1-4.9 | ≤0.25 | ≤0.5 | 5-8 | ≤1 | --- | Irregular | ≤1 | 95-105 |
| BRC88 | Mixture | Mixture | 88+ | 20-35 | 4.1-4.9 | ≤0.25 | ≤0.5 | 5-8 | ≤1 | --- | Irregular | ≤1 | 95-105 |

## PRIMER GRADE

## IRON OXIDE RED

|       |        |                                |     |       |     |       |      |     |    |      |           |      |        |
|-------|--------|--------------------------------|-----|-------|-----|-------|------|-----|----|------|-----------|------|--------|
| PR111 | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 70+ | 15-25 | 5.0 | ≤0.01 | ≤0.6 | 5-8 | ≤1 | 6.0+ | Spherical | ≤1   | 95-105 |
| PR222 | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 70+ | 15-25 | 5.0 | ≤0.1  | ≤0.6 | 5-8 | ≤1 | 3.0+ | Spherical | ≤1   | 95-105 |
| PR225 | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 60+ | 15-25 | 5.0 | ≤0.1  | ≤0.6 | 5-8 | ≤1 | 3.0+ | Spherical | ≤1   | 95-105 |
| PR180 | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 95+ | 15-25 | 5.0 | ≤0.25 | ≤0.4 | 4-8 | ≤1 | ---  | Spherical | ≤1   | 95-105 |
| PR801 | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 70+ | 15-25 | 5.0 | ≤0.1  | ≤0.6 | 5-8 | ≤1 | 6.0+ | Spherical | ≤2.5 | 90-100 |
| PR802 | PR 101 | Fe <sub>2</sub> O <sub>3</sub> | 70+ | 15-25 | 5.0 | ≤0.1  | ≤0.6 | 5-8 | ≤1 | 6.0+ | Spherical | ≤2.5 | 90-100 |

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## CATHAYCOAT™ SPECIALTY PIGMENT

Colors Represent Mass Tone and Tint Tone (Reduction with TiO<sub>2</sub> 1:4)

## ZINC FERRITE

|           | ZF15 | ZF25 |
|-----------|------|------|
| MASS TONE |      |      |
| TINT TONE |      |      |

## MANGANESE FERRITE

|           | F9900M | F9900MB |
|-----------|--------|---------|
| MASS TONE |        |         |
| TINT TONE |        |         |

## CHROME OXIDE GREEN

|           | GA74 | GA76 | GA78 | GA74M | GA76M | GA78M |
|-----------|------|------|------|-------|-------|-------|
| MASS TONE |      |      |      |       |       |       |
| TINT TONE |      |      |      |       |       |       |

## UMBERS

|           | UR81 | UB82 | UB83 | UB84 | UB85 | UB86 |
|-----------|------|------|------|------|------|------|
| MASS TONE |      |      |      |      |      |      |
| TINT TONE |      |      |      |      |      |      |

## Typical Physical Properties (Specialty Pigment)

| Product Code | Pigment Index | Chemical Composition | Purity, %<br>(as Fe <sub>2</sub> O <sub>3</sub> or Cr <sub>2</sub> O <sub>3</sub> ) | Oil Absorption<br>(g/100g) | Density<br>(g/cm <sup>3</sup> ) | Sieve Residue<br>on 325 mesh<br>(%) | Water Soluble Salts<br>(%) | pH        | Moisture<br>(%) | Hegman     | Particle Shape      | DE         | Tinting Strength<br>(%) |
|--------------|---------------|----------------------|---|----------------------------|---------------------------------|-------------------------------------|----------------------------|-----------|-----------------|------------|---------------------|------------|-------------------------|
| Test Method  |               |                      | BS1014  | ISO 787-5                  | ISO 787-10                      | ISO 787-7                           | ISO 787-3                  | ISO 787-9 | ISO 787-2       | ASTM D1210 | Electron Micrograph | ISO 7724-2 | ISO 8781-1              |

## ZINC FERRITE

|      |        |                                      |     |       |     |      |      |     |    |      |           |    |        |
|------|--------|--------------------------------------|-----|-------|-----|------|------|-----|----|------|-----------|----|--------|
| ZF15 | PY 119 | ZnO • Fe <sub>2</sub> O <sub>3</sub> | 65+ | 15-25 | 5.0 | ≤0.1 | ≤0.5 | 5-8 | ≤1 | 2.0+ | Spherical | ≤1 | 95-105 |
| ZF25 | PY 119 | ZnO • Fe <sub>2</sub> O <sub>3</sub> | 65+ | 15-25 | 5.0 | ≤0.1 | ≤0.5 | 5-8 | ≤1 | 2.0+ | Spherical | ≤1 | 95-105 |

## MANGANESE FERRITE

|         |        |                                     |     |       |     |      |      |     |    |      |           |    |        |
|---------|--------|-------------------------------------|-----|-------|-----|------|------|-----|----|------|-----------|----|--------|
| F9900M  | PBk 33 | (Fe,Mn) <sub>2</sub> O <sub>3</sub> | 65+ | 15-25 | 5.0 | ≤0.1 | ≤0.4 | 5-8 | ≤1 | 6.0+ | Spherical | ≤1 | 95-105 |
| F9900MB | PBk 33 | (Fe,Mn) <sub>2</sub> O <sub>3</sub> | 65+ | 15-25 | 5.0 | ≤0.1 | ≤0.4 | 5-8 | ≤1 | 6.0+ | Spherical | ≤1 | 95-105 |

## CHROME OXIDE GREEN

|       |       |                                |       |       |     |       |      |     |    |      |           |    |        |
|-------|-------|--------------------------------|-------|-------|-----|-------|------|-----|----|------|-----------|----|--------|
| GA74  | PG 17 | Cr <sub>2</sub> O <sub>3</sub> | 98.5+ | 15-25 | 5.2 | ≤0.1  | ≤0.3 | 5-8 | ≤1 | ---  | Spherical | ≤1 | 95-105 |
| GA76  | PG 17 | Cr <sub>2</sub> O <sub>3</sub> | 98.5+ | 15-25 | 5.2 | ≤0.1  | ≤0.3 | 5-8 | ≤1 | ---  | Spherical | ≤1 | 95-105 |
| GA78  | PG 17 | Cr <sub>2</sub> O <sub>3</sub> | 98.5+ | 15-25 | 5.2 | ≤0.1  | ≤0.3 | 5-8 | ≤1 | ---  | Spherical | ≤1 | 95-105 |
| GA74M | PG 17 | Cr <sub>2</sub> O <sub>3</sub> | 98.5+ | 15-25 | 5.2 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Spherical | ≤1 | 95-105 |
| GA76M | PG 17 | Cr <sub>2</sub> O <sub>3</sub> | 98.5+ | 15-25 | 5.2 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Spherical | ≤1 | 95-105 |
| GA78M | PG 17 | Cr <sub>2</sub> O <sub>3</sub> | 98.5+ | 15-25 | 5.2 | ≤0.01 | ≤0.3 | 5-8 | ≤1 | 6.0+ | Spherical | ≤1 | 95-105 |

## UMBERS

|      |       |                                |     |      |     |       |     |     |    |      |          |    |        |
|------|-------|--------------------------------|-----|------|-----|-------|-----|-----|----|------|----------|----|--------|
| UR81 | PBr 7 | Fe <sub>2</sub> O <sub>3</sub> | 55+ | 55.8 | 3.1 | ≤0.05 | --- | 8.0 | ≤1 | 5.0+ | Goethite | ≤1 | 95-105 |
| UB82 | PBr 7 | Fe <sub>2</sub> O <sub>3</sub> | 50+ | 62   | 2.9 | ≤0.15 | --- | 7.8 | ≤1 | 5.0+ | Hematite | ≤1 | 95-105 |
| UB83 | PBr 7 | Fe <sub>2</sub> O <sub>3</sub> | 57+ | 53   | 3.6 | ≤0.05 | --- | 8.1 | ≤1 | 5.0+ | Hematite | ≤1 | 95-105 |
| UB84 | PBr 7 | Fe <sub>2</sub> O <sub>3</sub> | 61+ | 46.5 | 3.0 | ≤0.1  | --- | 7.8 | ≤1 | 5.0+ | Hematite | ≤1 | 95-105 |
| UB85 | PBr 7 | Fe <sub>2</sub> O <sub>3</sub> | 55+ | 55   | 3.6 | ≤0.1  | --- | 7.5 | ≤1 | 5.0+ | Hematite | ≤1 | 95-105 |
| UB86 | PBr 7 | Fe <sub>2</sub> O <sub>3</sub> | 58+ | 54   | 3.7 | ≤0.01 | --- | 7.5 | ≤1 | 5.0+ | Hematite | ≤1 | 95-105 |

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