QUALITY COLORS.

Global Shade Card

Synthetic Iron and Chromium Oxide Pigments
for Paints & Coatings

BAYFERROX® Color for Life. COLORTHERM® Color for Life.

QUALITY WORKS.

LANXESS Energizing Chemistry

INORGANIC PIGMENTS
FOR PAINTS AND COATINGS

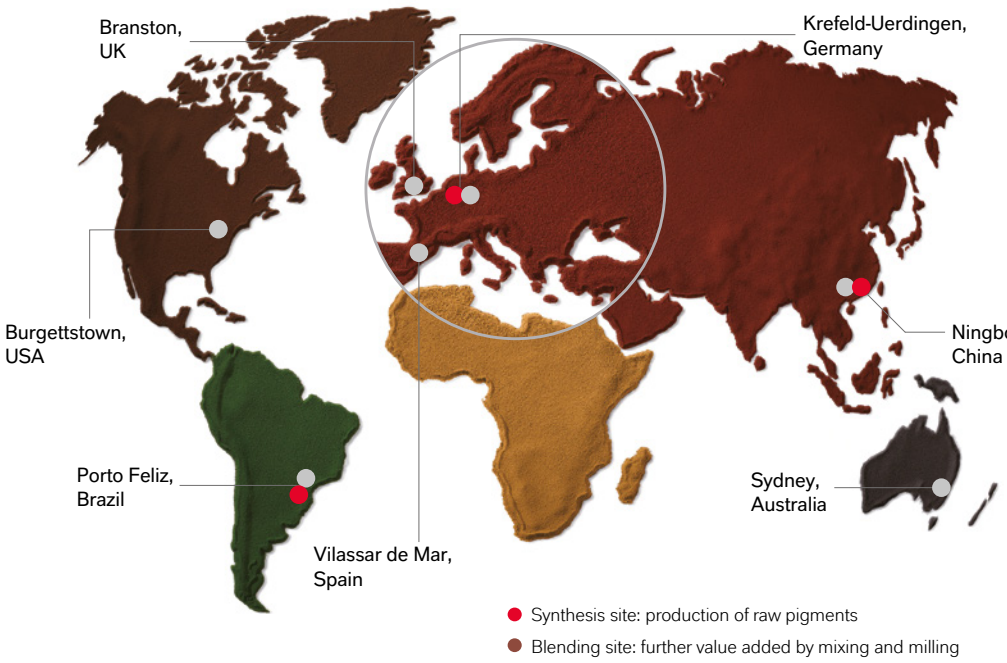
LANXESS is the world's largest manufacturer of synthetic iron oxides and a leading producer of inorganic pigments based on chromium oxides. The high tinting strength products of our Bayferrox® and Colortherm® ranges are highly suitable for use in the paints and coatings sector.

For almost 100 years, LANXESS iron and chromium oxide pigments have been well established in the paints and coatings industry. The variety of applications ranges from emulsion and decorative paints, industrial, powder, coil, automotive, corrosion protection to wood and furniture coatings.

The quality requirements of the paints and coatings industry are high relative to other industries. As a supplier of choice we offer our customers decisive benefits in terms of product quality, product variety, service offering and supply reliability:

- As a true one-stop-shop supplier, LANXESS delivers a complete solution for iron oxide consumers from its wholly owned production sites all around the world. The portfolio includes Bayferrox® red, yellow, black and brown iron oxide pigments. In addition we offer green shades based on Colortherm® chromium oxide pigments.
- Our comprehensive production network encompasses synthesis plants as well as mixing and milling sites around the globe. Through a combination of controlled and consistent use of raw materials, permanent quality control procedures to officially recognized test methods and worldwide standards, we ensure that our products reliably meet the specified quality standards of our customers.
- By utilizing a number of different production processes, as indicated in the shade card by this symbol, we are able to manufacture iron oxide pigments with very specific product properties that match the requirements of the respective paints and coatings applications.
- In our downstream refining processes, all of our pigments are milled, which significantly reduces the quantity of agglomerates in the pigment and increases the number of primary particles. In addition, the portfolio includes very intensively milled, "micronized" pigment grades which are particularly suitable for dispersion with high-speed dissolvers.
- Our technical experts provide worldwide customer support. Specialists investigate customer inquiries under realistic conditions in comprehensively equipped laboratories. This includes dispersibility testing in various coatings systems as well as measurement of color values and viscosity behavior.

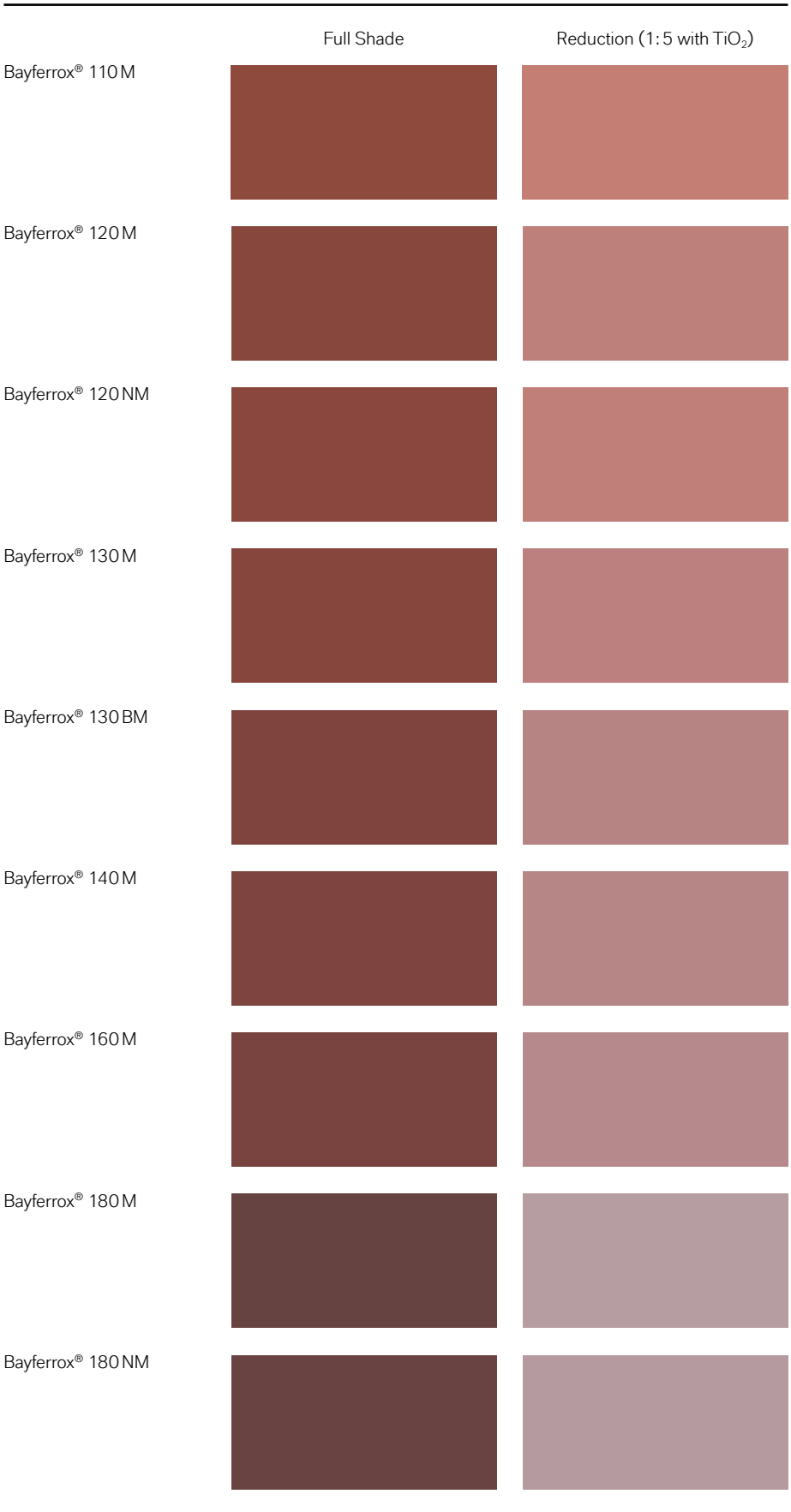
The list of products presented in this brochure is only a selection of the most relevant globally available Bayferrox® and Colortherm® products. Please get in touch with your local sales contact for further information.



LANXESS Inorganic Pigments is a world leader in iron oxide and chromium oxide pigments with a strong global production network, headquartered in Germany.

RED IRON OXIDE PIGMENTS

General Paints and Coatings Applications



Laux Process

Bayferrox® Pigment Properties

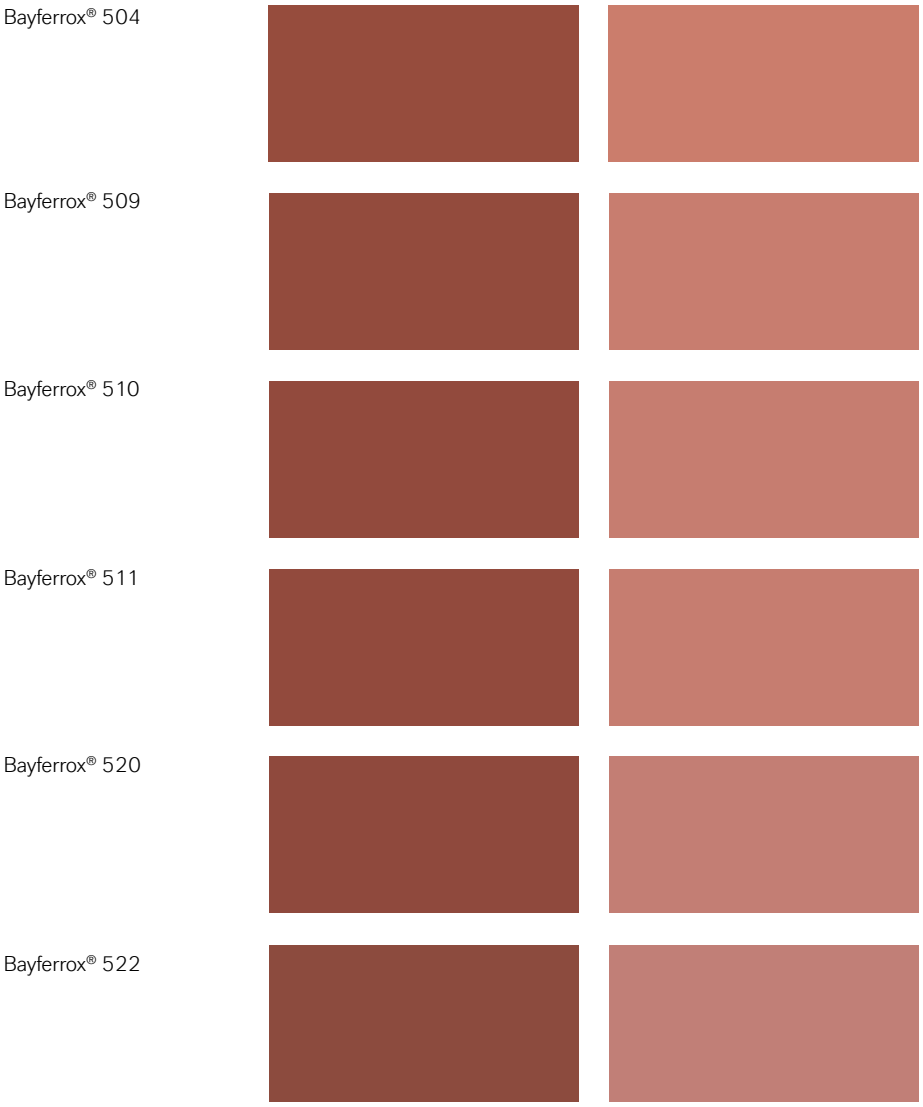
- Nearly spherical particles
- Very low proportion of pigment agglomerates due to micronization
- Predominant particle size between 0.1 µm and 0.7 µm
- From the Bayferrox® 110 M to the Bayferrox® 180 NM, the color shade changes from a yellow-shade red to a blue-shade as the predominant particle size increases.
- Very low sieve residue ≤ 0.002 %
- Very low electrical conductivity
- Stable against color change during heat exposure to minimum 600 °C (1100 °F)

Application Properties

- Easy dispersibility
- High tinting strength
- Final systems usually develop slight pseudoplastic flow behavior
- High stability against color change during high energy dispersion processing

RED IRON OXIDE PIGMENTS

General Paints and Coatings Applications



Ningbo Process®

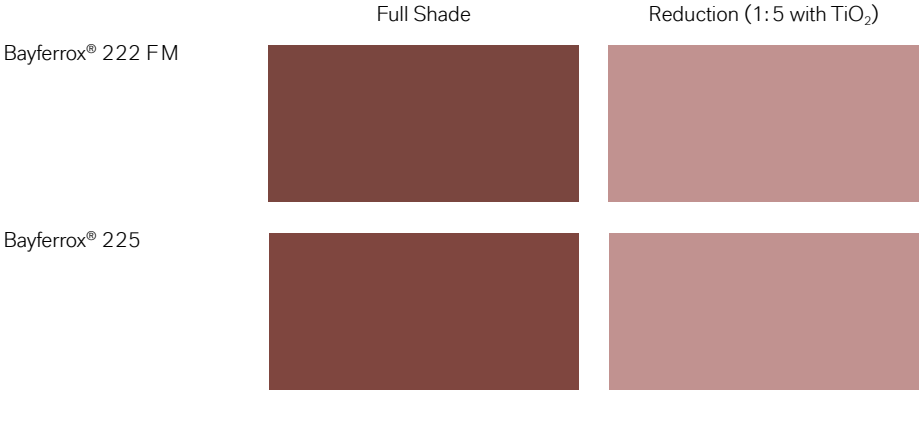
Bayferrox® Pigment Properties

- Nearly spherical particles
- Regular milled
- Predominant particle size between 0.1 µm and 0.2 µm
- Stable against color change during heat exposure to minimum 400 °C (750 °F)

Application Properties

- Easy dispersibility
- High chromaticity C* combined with red value a* and yellow value b*
- Final systems develop slight pseudoplastic flow behavior
- Option to formulate at high loadings
- High stability against color change during high energy dispersion processing

Primer Applications



Laux Process

Bayferrox® Pigment Properties

- Nearly spherical particles
- Very low electrical conductivity

Specific Pigment Properties

Bayferrox® 222 FM

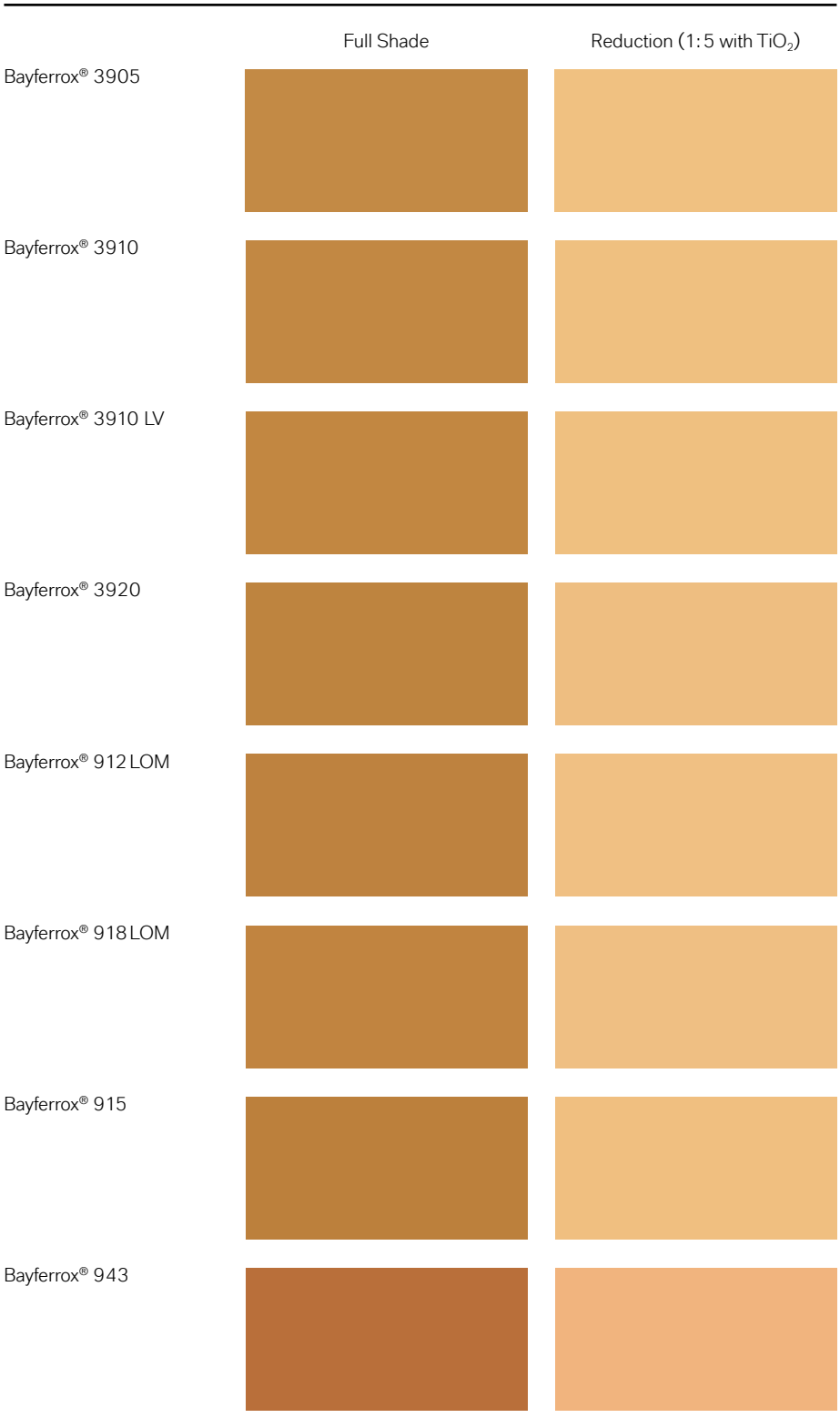
- Very low proportion of pigment agglomerates due to micronization

Bayferrox® 225

- Regular milled
- High red value a*

YELLOW IRON OXIDE PIGMENTS

General Paints and Coatings Applications



Precipitation and Penniman Process

Bayferrox® Pigment Properties

- Needle-shaped particles (except Bayferrox® 915)
- Stable against color change during heat exposure to approx. 180 °C (350 °F)

Application Properties

- Especially suitable for highly concentrated paste systems
- Easy dispersibility
- High tinting strength
- Final systems usually develop slight pseudoplastic flow behavior
- High stability against color change during high energy dispersion processing
- Option to formulate at high loadings

Specific Pigment Properties

Bayferrox® 3905, 3910, 3910 LV, 3920, 912 LOM, 918 LOM

- Very low proportion of pigment agglomerates due to micronization
- Notably reduced oil absorption

Bayferrox® 915

- Almost spherical particles
- Regular milled
- Reduced silking effect

Bayferrox® 943

- Regular milled
- Special crystal structure for unique orange shade color

YELLOW IRON OXIDE PIGMENTS

Heat stable Paints and Coatings

	Full Shade	Reduction (1:5 with TiO_2)
Colortherm® Yellow 5		
Colortherm® Yellow 10		
Colortherm® Yellow 3950		

Laux, Penniman and Precipitation Process

Bayferrox® Pigment Properties

- Needle-shaped particles of different structure
- Pigments with high stability against color change during heat exposure

Specific Pigment Properties

Colortherm® Yellow 5, Yellow 10

- Primary particles with an inorganic surface treatment
- Regular milled (Colortherm® Yellow 5) and micronized (Colortherm® Yellow 10)
- Heat stability approx. 220 °C (430 °F)

Colortherm® Yellow 3950

- Synthetic zinc ferrite with heat stability of approx. 300 °C (530 °F)
- Very low proportion of pigment agglomerates due to micronization

SPECIALTY PIGMENTS

General Paints and Coatings Applications

	Full Shade	Reduction (1:5 with TiO_2)
Bayferrox® 303 T		
Bayferrox® 645 T		
Colortherm® Green GN-M		

Special Processes

Specific Pigment Properties

Bayferrox® 303 T, 645 T

- Synthetic mixed iron and manganese oxides
- Very low proportion of pigment agglomerates due to micronization
- Stability against color change to minimum 500 °C (930 °F)
- Pronounced spectral reflection in the near infrared (NIR) range to reduce heat absorption on subjacent substrates
- Very little tendency to re-flocculation

Colortherm® Green GN-M

- Chromium (III) oxide
- Very low proportion of pigment agglomerates due to micronization
- Extremely high stability against color change and decomposition up to 1000 °C (1830 °F)

BLACK IRON OXIDE PIGMENTS

General Paints and Coatings Applications

	Full Shade	Reduction (1:5 with TiO_2)
Bayferrox® 306		
Bayferrox® 316		
Bayferrox® 318 M		
Bayferrox® 318 MB		
Bayferrox® 360		

Laux and Precipitation Process

Bayferrox® Pigment Properties

- Nearly spherical particles
- Mean particle size between 0.2 µm and 0.5 µm
- Stable against color change during heat exposure to approx. 180 °C (350 °F)

Application Properties

- Easy dispersibility
- Final systems usually develop slight pseudoplastic flow behavior

Specific Pigment Properties

Bayferrox® 306, 316

- Regular milled
- Blue shaded blacks

Bayferrox® 318 M, 318 MB

- Very low proportion of pigment agglomerates due to micronization
- Bayferrox® 318 MB with higher tinting strength and bluish shade compared to Bayferrox® 318 M

Bayferrox® 360

- Regular milled
- Well balanced blue cast color and tinting strength on highest level

TECHNICAL DATA
Inorganic Pigments

BAYFERROX® Color for Life. COLORTHERM® Color for Life.

Grade	Bayferrox®	Color Index	CAS Nr.	Specified Color Data: Full Shade[1] dL*	da*	db*	dC*	dH*	dEab*	Reduction[2] Color values after matching of the tinting strength parameter Y, i.e. dL*=0 da*	db*	dC*	dH*	dEab*	Rel. tinting strength [%]	Specified Technical Data: Dispersibility[3] [µm]	Water soluble content [%] DIN EN ISO 787-3:2000 and DIN EN ISO 787-8:2000	Sieve residue [%] DIN EN ISO 787-7:2009	pH value DIN EN ISO 787-9:1995	Informative Data: Oil absorption [g/100g] DIN EN ISO 787-5	Predominant particle size [µm] Electron micrograph
Red Iron Oxides																					
General Paints and Coatings Applications	110 M	PR 101	1309-37-1	+/-0.4	+/-0.6	+/-0.7	+/-0.8	+/-0.8	≤1.0	+/-0.5	+/-0.5	+/-0.6	+/-0.6	≤0.8	100 +/-5	20/35/50	≤0.5	≤0.002	4-7	~28	0.09
	120 M	PR 101	1309-37-1	+/-0.4	+/-0.6	+/-0.7	+/-0.8	+/-0.8	≤1.0	+/-0.5	+/-0.5	+/-0.6	+/-0.6	≤0.8	100 +/-5	20/35/50	≤0.5	≤0.002	5-8	~28	0.12
	120 NM	PR 101	1309-37-1	+/-0.4	+/-0.6	+/-0.7	+/-0.8	+/-0.8	≤1.0	+/-0.5	+/-0.5	+/-0.6	+/-0.6	≤0.8	100 +/-5	20/35/50	≤0.5	≤0.002	5-8	~28	0.11
	130 M	PR 101	1309-37-1	+/-0.4	+/-0.6	+/-0.7	+/-0.8	+/-0.8	≤1.0	+/-0.5	+/-0.5	+/-0.6	+/-0.6	≤0.8	100 +/-5	15/30/40	≤0.4	≤0.002	5-8	~27	0.17
	130 BM	PR 101	1309-37-1	+/-0.4	+/-0.6	+/-0.7	+/-0.8	+/-0.8	≤1.0	+/-0.5	+/-0.5	+/-0.6	+/-0.6	≤0.8	100 +/-5	15/30/40	≤0.4	≤0.002	5-8	~26	0.22
	140 M	PR 101	1309-37-1	+/-0.4	+/-0.6	+/-0.7	+/-0.8	+/-0.8	≤1.0	+/-0.5	+/-0.5	+/-0.6	+/-0.6	≤0.8	100 +/-5	15/30/40	≤0.4	≤0.002	5-8	~24	0.3
	160 M	PR 101	1309-37-1	+/-0.4	+/-0.6	+/-0.7	+/-0.8	+/-0.8	≤1.0	+/-0.5	+/-0.5	+/-0.6	+/-0.6	≤0.8	100 +/-5	15/30/40	≤0.4	≤0.002	5-8	~22	0.4
	180 M	PR 101	1309-37-1	+/-0.4	+/-0.6	+/-0.7	+/-0.8	+/-0.8	≤1.0	+/-0.5	+/-0.5	+/-0.6	+/-0.6	≤0.8	100 +/-5	15/30/40	≤0.3	≤0.002	5-8	~22	0.7
	180 NM	PR 101	1309-37-1	+/-0.4	+/-0.6	+/-0.7	+/-0.8	+/-0.8	≤1.0	+/-0.5	+/-0.5	+/-0.6	+/-0.6	≤0.8	100 +/-5	15/30/40	≤0.3	≤0.002	5-8	~22	0.7
Red Iron Oxides																					
General Paints and Coatings Applications	504	PR 101	1309-37-1	+/-0.5	+/-0.8	+/-0.8			≤1.0	+/-0.8	+/-0.8			≤1.0	100 +/-5		≤0.5	≤0.05	3-7	~20	0.1
	509	PR 101	1309-37-1	+/-0.5	+/-0.8	+/-0.8			≤1.0	+/-0.8	+/-0.8			≤1.0	100 +/-5		≤0.5	≤0.05	3-7	~20	0.1
	510	PR 101	1309-37-1	+/-0.5	+/-0.8	+/-0.8			≤1.0	+/-0.8	+/-0.8			≤1.0	100 +/-5		≤0.5	≤0.05	3-7	~20	0.1
	511	PR 101	1309-37-1	+/-0.5	+/-0.8	+/-0.8			≤1.0	+/-0.8	+/-0.8			≤1.0	100 +/-5		≤0.5	≤0.05	3-7	~20	0.1
	520	PR 101	1309-37-1	+/-0.5	+/-0.8	+/-0.8			≤1.0	+/-0.8	+/-0.8			≤1.0	100 +/-5		≤0.5	≤0.05	3-7	~20	0.1
	522	PR 101	1309-37-1	+/-0.5	+/-0.8	+/-0.8			≤1.0	+/-0.8	+/-0.8			≤1.0	100 +/-5		≤0.5	≤0.05	3-7	~20	0.1
Red Iron Oxides																					
Primer Applications	222 FM	PR 101	1309-37-1	+/-0.5	+/-1.0	+/-1.2			≤1.5	+/-1.2	+/-1.4			≤1.7	100 -5/+10	30/50/75	≤0.5	≤0.003	5-8	~15	0.2
	225	PR 101	1309-37-1	+/-0.5	+/-1.3	+/-1.5			≤1.7					≤2.0	100 +/-5		≤0.5	≤0.1	5-9	~18	0.2
Yellow Iron Oxides																					
General Paints and Coatings Applications	3905	PY 42	51274-00-1	+/-0.4	+/-0.8	+/-0.9	+/-0.8	+/-0.8	≤1.0	+/-0.5	+/-0.6	+/-0.6	+/-0.6	≤0.8	100/+/-3	20/35/50	≤0.5	≤0.002	4.5-7.5	~38	0.1x0.4
	3910	PY 42	51274-00-1	+/-0.4	+/-0.8	+/-0.9	+/-0.8	+/-0.8	≤1.0	+/-0.5	+/-0.6	+/-0.6	+/-0.6	≤0.8	100/+/-3	20/35/50	≤0.5	≤0.002	4.5-7.5	~35	0.1x0.4
	3910 LV	PY 42	51274-00-1	+/-0.4	+/-0.8	+/-0.9	+/-0.8	+/-0.8	≤1.0	+/-0.5	+/-0.6	+/-0.6	+/-0.6	≤0.8	100 +/-5	20/35/50	≤0.5	≤0.002	4.5-7.5	~35	0.1x0.4
	3920	PY 42	51274-00-1	+/-0.4	+/-0.8	+/-0.9	+/-0.8	+/-0.8	≤1.0	+/-0.5	+/-0.6	+/-0.6	+/-0.6	≤0.8	100/+/-3	20/35/50	≤0.5	≤0.002	4.5-7.5	~35	0.1x0.4
	915	PY 42	51274-00-1	+/-0.4	+/-0.8	+/-0.9	+/-0.8	+/-0.8	≤1.0	+/-0.8	+/-0.8	+/-0.8	+/-0.8	≤0.8	100 +/-5		≤0.5	≤0.05	3.5-7.5	~32	0.5
	943	PY 42	51274-00-1	+/-0.5	+/-1.0	+/-1.0	+/-1.0	+/-1.0	≤1.0	+/-0.8	+/-0.8	+/-0.8	+/-0.8	≤0.8	100 +/-5		≤0.5	≤0.05	3.5-7.5	~30	0.05 x 0.3
	912 LOM	PY 42	51274-00-1	+/-0.6	+/-0.6	+/-0.6			≤1.0	+/-0,6	+/-0,6			≤1.0	100 +/-5		≤0.5	≤0.008	4-8	22-28	
	918 LOM	PY 42	51274-00-1	+/-0.6	+/-0.6	+/-0.6			≤1.0	+/-0,6	+/-0,6			≤1.0	100 +/-5		≤0.5	≤0.008	4-8	22-28	
Yellow Iron Oxides																					
Heat stable Paints and Coatings	Colortherm® Yellow 5	PY 42	51274-00-1	+/-0.5	+/-0.8	+/-1.0			≤1.2	+/-0.6	+/-1.0			≤1.2	100 +/-5		≤1	≤0.04	5-8		0.1 x 0.6
	Colortherm® Yellow 10	PY 42	51274-00-1	+/-0.5	+/-0.8	+/-1.0			≤1.2	+/-0.6	+/-1.0			≤1.2	100 +/-5		≤0.5	≤0.02	3.5-7.5	~50	0.1 x 07
	Colortherm® Yellow 3950	PY 119	68187-51-9	-0.4/+0.5	+/-1.0	+/-1.4			≤1.7	+/-1.1	+/-1.5			≤1.7	100 -5/+10	30/50/75	≤0.5	≤0.005	6-10	~16	0.15 x 0.5
Black Iron Oxides																					
General Paints and Coatings Applications	306	PBk 11	1317-61-9							+/-0.7	+/-0.9			≤1.0	100 -5/+10		≤0.5	≤0.05	4-8	~24	0.5
	316	PBk 11	1317-61-9							+/-0.7	+/-0.9			≤1.0	100 -5/+10		≤0.8	≤0.1	4-8	~21	0.3
	318 M	PBk 11	1317-61-9							+/-0.5	+/-0.6	+/-0.6	+/-0.7	≤0.8	100 +/-5	30/50/75	≤0.7	≤0.005	4-8	~21	0.2
	318 MB	PBk 11	1317-61-9							+/-0.7	+/-0.9			≤1.0	100 -5/+10	30/50/75	≤0.7	≤0.005	4-8	~21	0.2
	360	PBk 11	1317-61-9							+/-0.7	+/-0.9			≤1.0	100 +/-5		≤0.5	≤0.1	4-8		0.3
Black, Brown and Green																					
General Paints and Coatings Applications	303 T	PBk 33	68186-94-7							+/-0.5	+/-0.6	+/-0.6	+/-0.7	≤0.8	100 +/-5	20/35/50	≤0.7	≤0.005	7-10	~16	0.6
	645 T	PBr 43	12062-81-6 & 68186-94-7	+/-0.5	+/-1.2	+/-1.3	+/-1.2	+/-1.2	≤1.5	+/-1.2	+/-1.3	+/-1.2	+/-1.2	≤1.5	100 -5/+10		≤0.8	≤0.1	5.5-8.5	~28	0.3
	Colortherm® Green GN-M	PG 17	1308-38-9	+/-0.5	+/-0.6	+/-0.6	+/-0.8	+/-0.8	≤1.0	+/-0.6	+/-0.6	+/-0.8	+/-0.8	≤1.0	100 +/-5	10/15/50	≤0.3	≤0.005	5-7	~11	0.3

[1] No.001 of 1995-04-28 / No.9 of 2001-01-02 [2] No.001 of 1995-04-28 / No.009 of 2001-01-02 / No.003 of 1994-03-11 [3] No. 004 of 1995-05-15 and PVS 17

As with any product, use of the products mentioned in this publication in a given application must be tested (including field testing, etc.) by the user in advance to determine suitability.

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Health and Safety Information

Appropriate literature has been assembled which provides information concerning the health and safety precautions that must be observed when handling the LANXESS products mentioned in this publication. For materials mentioned which are not LANXESS products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be followed. Before working with any of these products, you must read and become familiar with the available information on their hazards, proper use and handling. This cannot be overemphasized. Information is available in several forms, e.g. safety data sheets, product information and product labels. Consult your LANXESS representative in Germany or contact the Health, Safety, Environment and Quality Department (HSEQ) of LANXESS Germany or - for business in the USA - your LANXESS Corporation representative or contact the Product Safety and Regulatory Affairs Department in Pittsburg, PA.

Regulatory Compliance Information

Some of the end uses of the products described in this publication must comply with applicable regulations, such as the FDA, BfR, NSF, USDA, and CPSC. If you have any questions on the regulatory status of these products, contact – for business in the USA - the LANXESS Corporation Regulatory Affairs and Product Safety Department in Pittsburgh, PA, USA or for business outside US the Health, Safety, Environmental and Quality Department of LANXESS Deutschland GmbH in Germany.

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