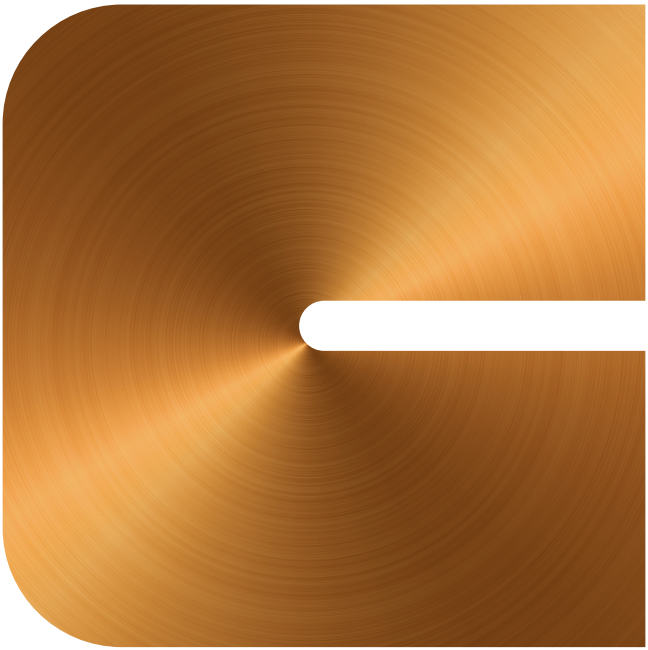
CLARIANT

Pigments
Special Applications
SANODAL®, SANODURE® AND SANODYE® DYES

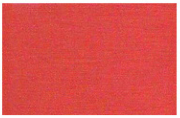
For the dyeing of anodized aluminum



what is precious to you?

Dark shade	Light shade	PRODUCT NAME
		SANODYE YELLOW 3GL
		SANODAL GOLD 4N
		SANODURE FAST GOLD L
		SANODURE ORANGE G
		SANODYE ORANGE 2B
		SANODYE GOLDEN ORANGE RLW
		SANODURE ORANGE RL
		SANODURE FAST BRONZE L
		SANODYE BROWN R
		SANODAL ORANGE 3LW LIQ.

Dark shade	Light shade	Recommended dye bath pH range	Dye bath buffer*	Light fastness[1]	Outdoor application	Indoor application	Heavy metal free structure	Supply form	Single dye (s) Mixture (m)
g/l	g/l								
3.0	0.1	5 – 6	S	> 9	●	●	●	Granules	s
30 (24 min)	30 (30 s)	4.5	–	> 9[2]	●	●		Powder	s
3.0	0.2	5 – 6	S	7 – 8		●		Granules	s
3.0	0.2	5.5 – 6.5	–	5 – 6		●		Granules	s
5.0	0.5	5.5 – 6	S	5 – 6		●	●	Powder	s
3.0	0.5	5.5 – 6.5	–	5 – 6		●	●	Granules	s
3.0	0.3	5.5 – 6.5	–	5 – 6		●	●	Granules	s
0.5	0.2	5 – 6	S	7 – 8		●		Granules	s
3.0	0.5	5 – 6	S	5 – 6		●	●	Granules	s
5.0	0.2	5 – 6	S	> 9	●	●		Liquid	s

Dark shade	Light shade	PRODUCT NAME
		SANODAL RED B3LW
		SANODYE RED GLW
		SANODYE RED RLW
		SANODURE FIERY RED ML
		SANODYE MAGENTA LF
		SANODURE BORDEAUX RL
		SANODURE VIOLET CLW
		SANODYE VIOLET MRB NEW
		SANODYE BLUE 2LW
		SANODYE BLUE G

Dark shade	Light shade	Recommended dye bath pH range	Dye bath buffer*	Light fastness[1]	Outdoor application	Indoor application	Heavy metal free structure	Supply form	Single dye (s) Mixture (m)
g/l	g/l								
5.0	0.2	5 – 6	S	> 9	●	●		Granules	s
4.0	0.1	5 – 6	S	7		●	●	Granules	s
2.0	0.2	5 – 6	S	7		●	●	Granules	s
5.0	0.2	5 – 6	S	6 – 7		●		Granules	m
4.0	0.4	5 – 6	S	8 (12 µm)		●	●	Powder	s
5.0	0.5	5 – 6	S	6 – 7		●		Granules	s
0.3	0.1	5 – 6	S	6 – 7		●		Granules	s
5.0	0.2	5 – 6	S	3 – 4		●	●	Powder	s
3.0	0.1	5 – 6	A	> 9	●	●	●	Granules	s
3.0	0.1	5 – 6	A	> 9	●	●	●	Granules	s

Dark shade	Light shade	PRODUCT NAME
		SANODAL TURQUOISE PLW LIQ.
		SANODAL GREEN 3LW
		SANODURE GREEN LWN
		SANODURE BROWN GSL
		SANODURE BRONZE 2LW
		SANODURE BRONZE G
		SANODURE YELLOW BROWN 2G
		SANODURE OLIVE BROWN 2R
		SANODURE GREY NL LIQ.
		SANODURE GREY HLN LIQ.

Dark shade	Light shade	Recommended dye bath pH range	Dye bath buffer*	Light fastness[1]	Outdoor application	Indoor application	Heavy metal free structure	Supply form	Single dye (s) Mixture (m)
g/l	g/l								
5.0	0.1	5 – 6	S	> 9	●	●		Liquid	s
3.0	0.2	5 – 6	S	> 9	●	●		Granules	s
1.0	0.2	5 – 6	S	7 – 8		●		Granules	s
1.0	0.2	5 – 6	S	6 – 7		●		Granules	m
1.0	0.1	5 – 6	S	7		●		Granules	s
1.0	0.2	5 – 6	S	6 – 7		●		Granules	s
1.5	0.4	5 – 6	S	5 – 6		●		Granules	m
1.0	0.1	5 – 6	S	6		●		Granules	s
1.5	0.1	5 – 6	S	7 – 8		●		Liquid	s
0.3	0.1	5 – 6	S	7 – 8		●		Liquid	s

Dark shade	Light shade	PRODUCT NAME
		SANODAL BLACK 2LW
		SANODAL DEEP BLACK HBL LIQ.
		SANODAL DEEP BLACK H3LW
		SANODURE BLACK CRO
		SANODYE BLACK OA
		SANODAL DEEP BLACK MLW

Dark shade	Light shade	Recommended dye bath pH range	Dye bath buffer*	Light fastness[1]	Outdoor application	Indoor application	Heavy metal free structure	Supply form	Single dye (s) Mixture (m)
g/l	g/l								
10.0	1.0	4.5	-	> 9	●	●		Granules	s
10.0	0.2	5 – 6	S	> 8 (12 µm) > 10 (25 µm)	●	●		Liquid	s
10.0	0.2	5 – 6	S	> 8 (12 µm) > 10 (25 µm)	●	●		Paste	s
10.0	0.2	6.5 – 7.5	-	3 – 4 (12 µm) 7 – 8 (20 µm)		●	●	Powder	s
10.0	0.6	5 – 6	S	> 8	●	●	●	Granules	s
10.0	-	4.5	-	> 9	●	●		Granules Powder	m

Quality Products
FOR ANODIZED ALUMINUM

Clariant manufactures a full range of dyes and chemicals, many of which are patented. In 2009 Clariant introduced Sanodye grades, which do not contain heavy metals as structure element. Clariant has initiated the development of an improved sealing process with the target to cover a wide spectrum of economic (e. g. energy efficiency) and environmental (e. g. heavy metal free structures) aspects. The manufacturing of Clariant's dyes involves multi-step syntheses and utilizes many different process technologies. Precision, cleanliness and attention to the detail are key components to offer the finest products on the market. Clariant offers its customers technical service (e. g. color matching support), assistance to improve their production processes and guidance to reduce waste in production.

FOR THE DYEING OF ANODIZED ALUMINUM CLARIANT OFFERS THREE DYE RANGES:

SANODAL

· Excellent light- and weather fastness properties
· Suitable for outdoor and indoor applications
· Applicable alone or in combination with an electrolytic dyeing process
· Broad shade range accessible
· Designed for many architectural needs

SANODURE

· Comprehensive range of different colors, covering virtually all coloristic needs
· Good fade resistance properties
· Designed for indoor applications

SANODYE

· Organic dyes with heavy metal free structures
· Good to excellent fade resistance properties
· Designed for interior or outdoor applications as indicated in our technical data sheets
· Organic dyes with heavy metal free structures for more environmentally conscious applications

PRODUCTION CONDITIONS FOR THE ILLUSTRATIONS

ANODIZING	Current Density	1.2 – 1.8 A/dm^2
	Voltage	12 – 20 V
	Electrolyte	180 – 200 g/l free H_2SO_4 5 – 15 g/l Al
	Temperature	18 – 20 °C
	Time	25 – 75 min
	Oxide Layer	18 – 20 µm
DYEING	Temperature	25 – 60 °C
	Concentrations	See illustrations
	pH	Mainly 5.0 – 6.0 acetate buffered, exceptions see technical literature
	Time	10 – 35 min
SEALING	Temperature	> 96 °C
	Time	40 – 60 min
	Medium	Deionized water, pH 5.5 – 6.0 plus: 20 ml/l Anodal ASL (liq.) (Nickel sealing) or 3 g/l Anodal SH-1

For detailed information on pretreatment, anodizing, dyeing and sealing conditions, please check our technical brochure: Variations in Color: The dying of anodized aluminium.

IMPORTANT NOTES

· Pretesting in the customer specific material following the customer specific production process is absolutely necessary, especially with respect to compatibility and achievable shade
· The colored aluminum plaques cannot be used for tests of dye properties and coloristic comparisons

ABBREVIATIONS AND EXPLANATIONS

1 The light fastness ratings relate to ISO 2135 and ISO 105B02 and were done with deep shades at 12 µm anodized oxide layer thickness as described in our technical literature and do not necessarily refer to the illustrated plates in this shade card. With paler shades or lower oxide layer thicknesses, lower seal quality or softer layers, light fastness tends to be generally lower.

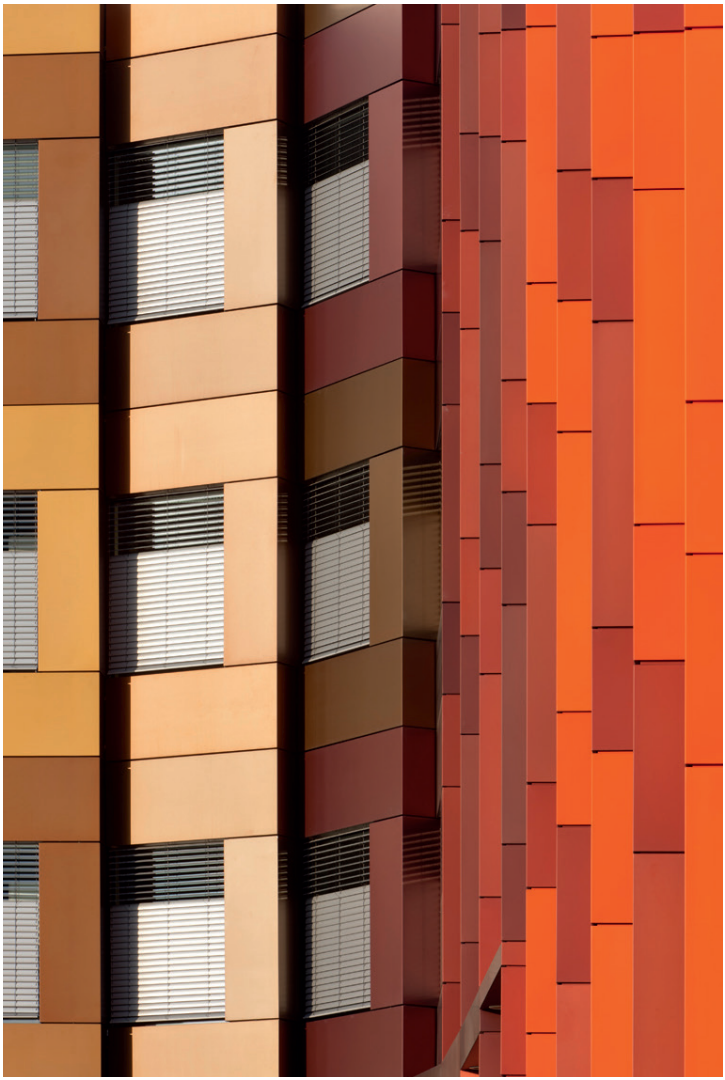
2 A first break phenomenon for ferrioxalate containing dyes is well known and documented in the literature: Those kind of compounds show a fading after a short radiation time (approximately 100 h) which then does not further degrade.

*** S SODIUM ACETATE BUFFERING:**

Add 8.0 g/l sodium acetate trihydrate ($NaCOOH.3H_2O$) into the dyeing tank; then slowly add approximately 0.4 ml/l acetic acid 100 % (conc. CH_3COOH) until the pH 5 – 6 is achieved.

*** A AMMONIUM ACETATE BUFFERING:**

Add 5.0 g/l ammonium acetate (NH_4COOH) into the dyeing tank; then slowly add approximately 0.5 ml/l acetic acid 100 % (conc. CH_3COOH) until the pH range 5 – 6 is achieved.



PRODUCT NAME	Solubility 20 °C / 60 °F
	g/l
SANODYE YELLOW 3GL	100
SANODAL GOLD 4N	> 300
SANODURE FAST GOLD L	60
SANODURE ORANGE G	40
SANODYE ORANGE 2B	7
SANODYE GOLDEN ORANGE RLW	100
SANODURE ORANGE RL	40
SANODURE FAST BRONZE L	100
SANODYE BROWN R	> 300
SANODAL ORANGE 3LW LIQ.	misc.
SANODAL RED B3LW	150
SANODYE RED GLW	50
SANODYE RED RLW	100
SANODURE FIERY RED ML	75
SANODYE MAGENTA LF	85
SANODURE BORDEAUX RL	50
SANODURE VIOLET CLW	20
SANODYE VIOLET MRB NEW	95
SANODYE BLUE 2LW	5

PRODUCT NAME	Solubility 20 °C / 60 °F
	g/l
SANODYE BLUE G	3
SANODAL TURQUOISE PLW LIQ.	misc.
SANODAL GREEN 3LW	100
SANODURE GREEN LWN	40
SANODURE BROWN GSL	10
SANODURE BRONZE 2LW	5
SANODURE BRONZE G	15
SANODURE YELLOW BROWN 2G	20
SANODURE OLIVE BROWN 2R	30
SANODURE GREY NL LIQ.	misc.
SANODURE GREY HLN LIQ.	misc.
SANODAL BLACK 2LW	50
SANODAL DEEP BLACK HBL LIQ.	misc.
SANODAL DEEP BLACK H3LW	misc.
SANODURE BLACK CRO	40
SANODYE BLACK OA	20
SANODAL DEEP BLACK MLW GRAN.	50
SANODAL DEEP BLACK MLW	50