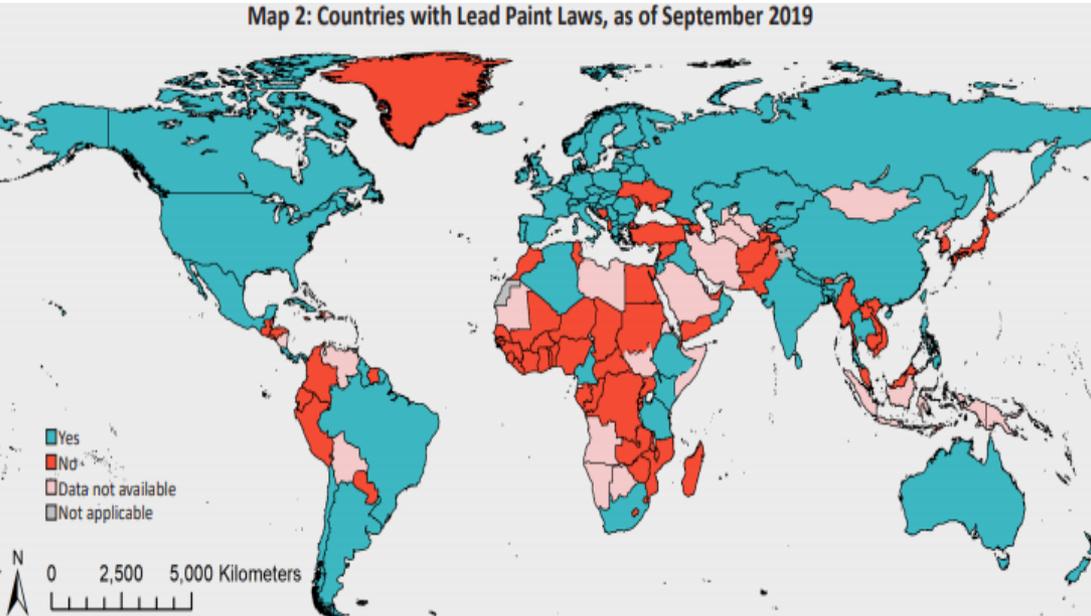


Pigmentos alternativos para la fabricación de pinturas libres de metales pesados: Principales características, ventajas y retos

Junio 2020

Regulations on Lead

Map 2: Countries with Lead Paint Laws, as of September 2019



2019 – 2021 - SAICM GEF Project: The project will assist governments to establish lead paint laws in at least 40 countries and provide guidance to industry to facilitate the shift to producing non-lead paints.

Table 2: Countries with Limits on Total Lead Concentration
(s) - limit applies to soluble lead content only

90 ppm	100 ppm	600 ppm	1000 ppm or higher
Bangladesh*	Switzerland	Argentina	Algeria
Canada	Thailand	Brazil	Armenia
Cameroon	United Republic of Tanzania	Chile	Australia
China (s)		Costa Rica	Belarus
Ethiopia		Dominica	Cuba
India		Guyana	New Zealand
Iraq		Mexico	
Israel*		Oman	
Jordan**		Panama	
Kenya		South Africa	
Nepal		Sri Lanka	
Philippines		Trinidad and Tobago	
United States of America		Uruguay	

*New since 1 October, 2018
**The law has been updated

Table 3: Countries with Chemical-Specific Regulatory Limits

Austria [^]	Czech Republic [^]	Germany [^]	Italy [^]	Lithuania [^]	Netherlands [^]	Portugal [^]	Slovenia [^]
Belgium [^]	Denmark [^]	Greece [^]	Kazakhstan	Luxembourg [^]	North Macedonia	Romania [^]	Spain [^]
Bulgaria [^]	Estonia [^]	Hungary [^]	Kyrgyzstan	Malta [^]	Norway [^]	Russian Federation	Sweden [^]
Croatia [^]	Finland [^]	Iceland [^]	Latvia [^]	Monaco	Poland [^]	Serbia	United Kingdom [^]
Cyprus [^]	France [^]	Ireland [^]	Liechtenstein [^]	Montenegro	Slovakia [^]		

[^]Countries that have adopted the EU REACH regulation

Source: Update on the global status of legal limits on lead in paints, United nations Environment program, September 2019

Nuestra agenda hoy

- Definición de necesidades para la sustitución
- Portafolio C.I. Ferro para la sustitución
- Solución Eco-Lysopac
 - Amarillos base solvente
 - Amarillos base agua
 - Rojos y Naranjas solvente y base agua.



Existen en el mercado diversas posibilidades para reemplazar los pigmentos cromo-plomo cada una con ventajas y/o desventajas

Que debo definir primero...



Gama de Ferro C.I. para Sustitución

- Ferro tiene una amplia gama de diferentes C.I. que pueden ayudar a reemplazar los cromatos / molibdatos de plomo

Biva (PY184/PO85)	<ul style="list-style-type: none">• Good performance, opacity, tinting strength, gloss• Higher Price
CICP (PY53/PBr24)	<ul style="list-style-type: none">• Good performance, opacity, price• Low tinting strength, dirtier, less gloss
Mono Azo (PY3/PY65/PY74)	<ul style="list-style-type: none">• Tinting strength, gloss• Medium to low performance, opacity
Dis Azo (PO34/PY83)	<ul style="list-style-type: none">• Tinting strength, gloss• Medium performance, opacity
Benzimidazolone (PY151/PY154/PY194/PO36)	<ul style="list-style-type: none">• Tinting strength, good performance, opacity, gloss• Higher price
Other HPP (PY138/PY139/PR170)	<ul style="list-style-type: none">• Tinting strength, good performance, opacity, gloss• Higher price

- Pero nunca la sustitucion es uno a uno; necesario el trabajo de formulación de los diferentes pigmentos para obtener el tono.
- Aumenta el número de referencias para el inventario.

Solución Ferro: Eco-Lysopac



Un monopigmento híbrido que equilibra todos los aspectos



Eco-Lysopac Amarillos

Gama de amarillos en sistema base solvente.



AL73*

9915C

9916C

6625B

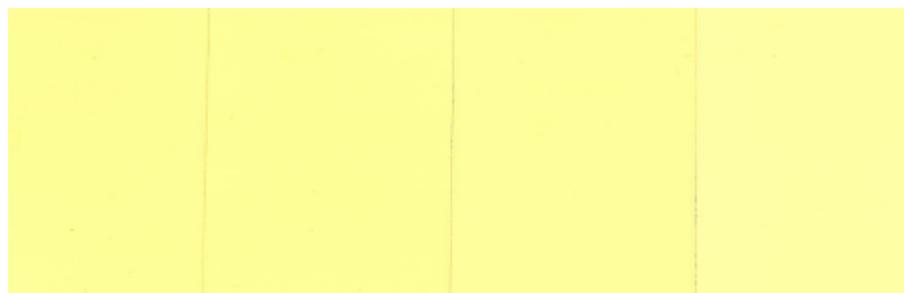


AL73*

9915C

9916C

6625B



AL80*

9914C

9924C

6624B

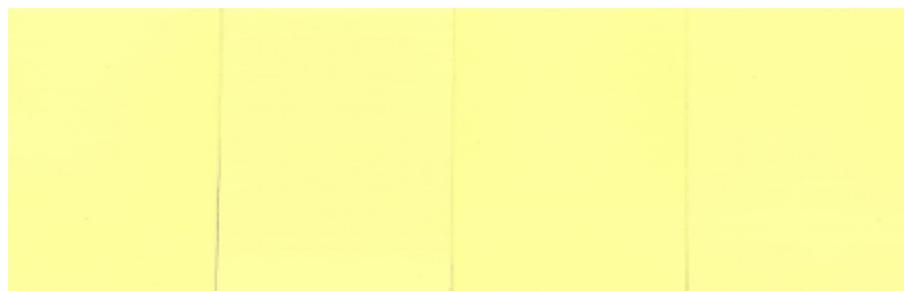


AL80*

9914C

9924C

6624B

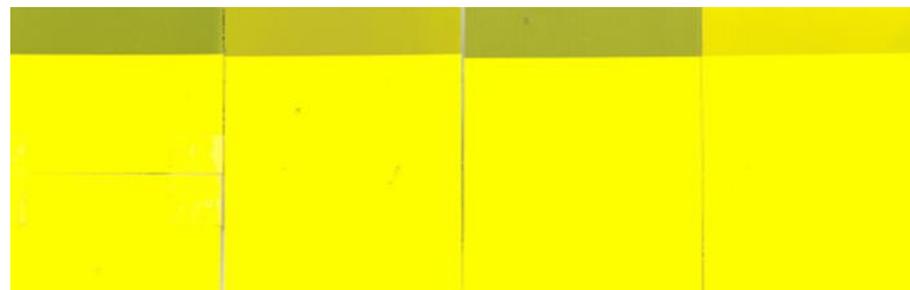


AL90*

9913C

9923C

6623B

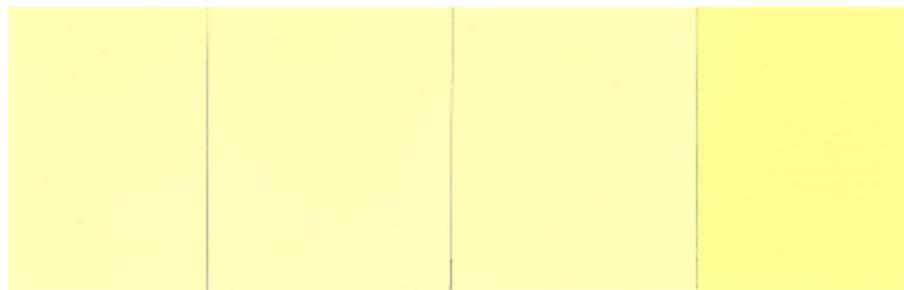


AL90*

9913C

9923C

6623B

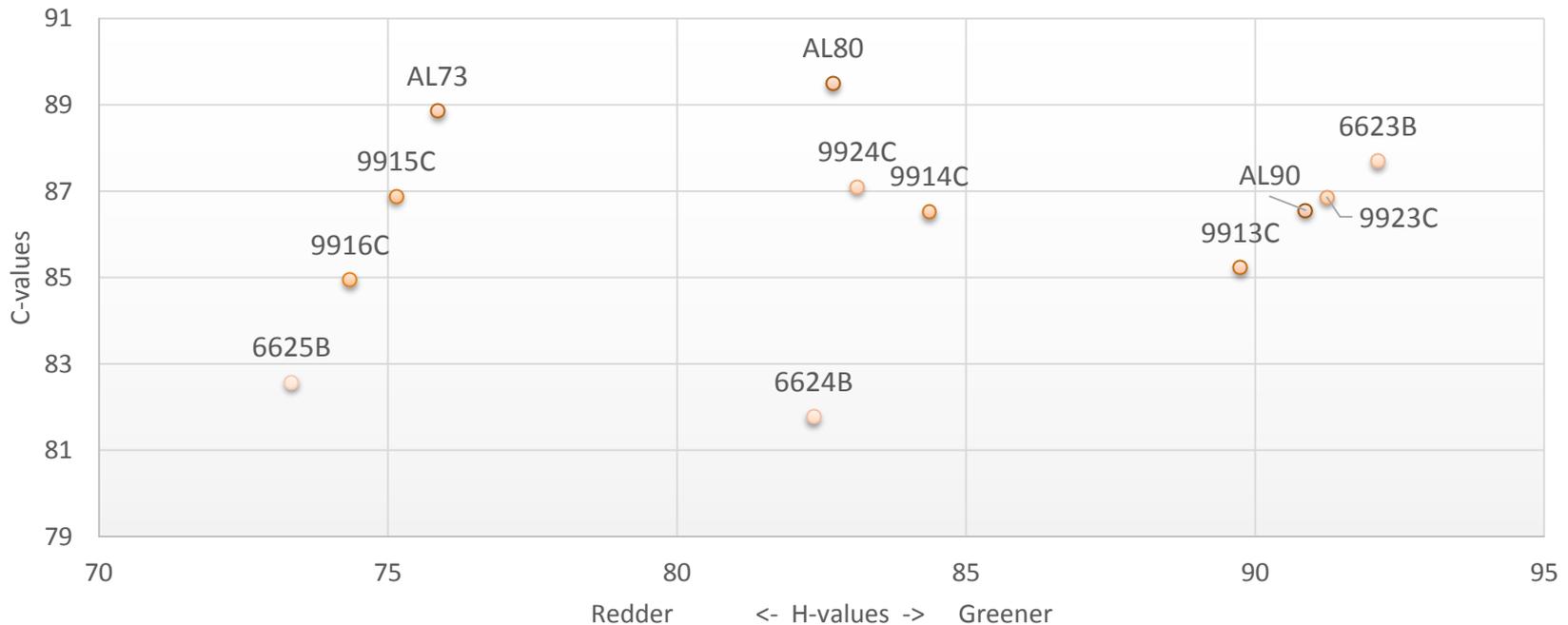


* Ferro lead chromate references

Alkyd Melamine at 10% pigmentation

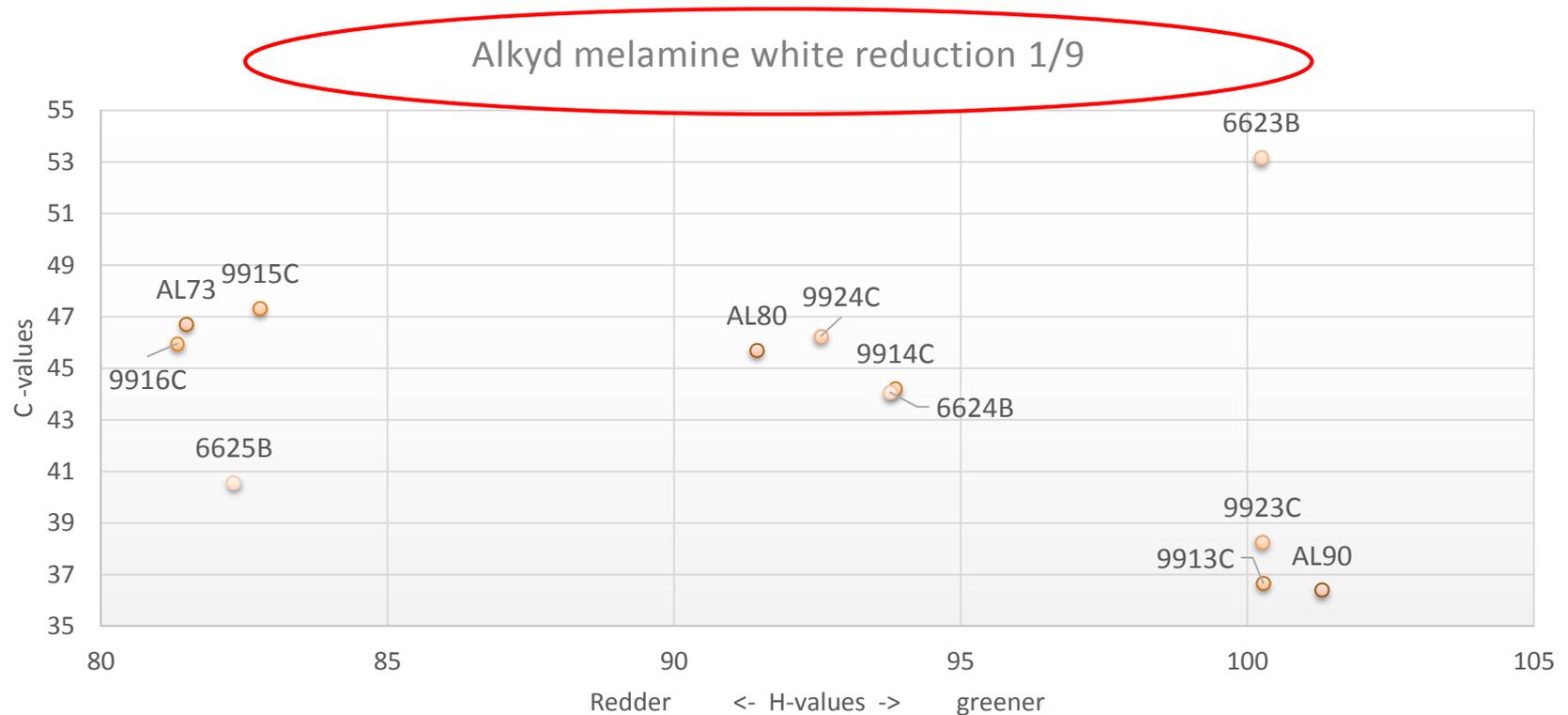
Lecturas colorimétricas Alkyd Melamine tono pleno

Alkyd Melamine 10% pigmentation Full Shade



Para cada parte del espectro amarillo hay varias soluciones de color disponibles tanto en tono pleno...

Lecturas colorimétricas Alquid Melamina Tono reducido con TiO₂

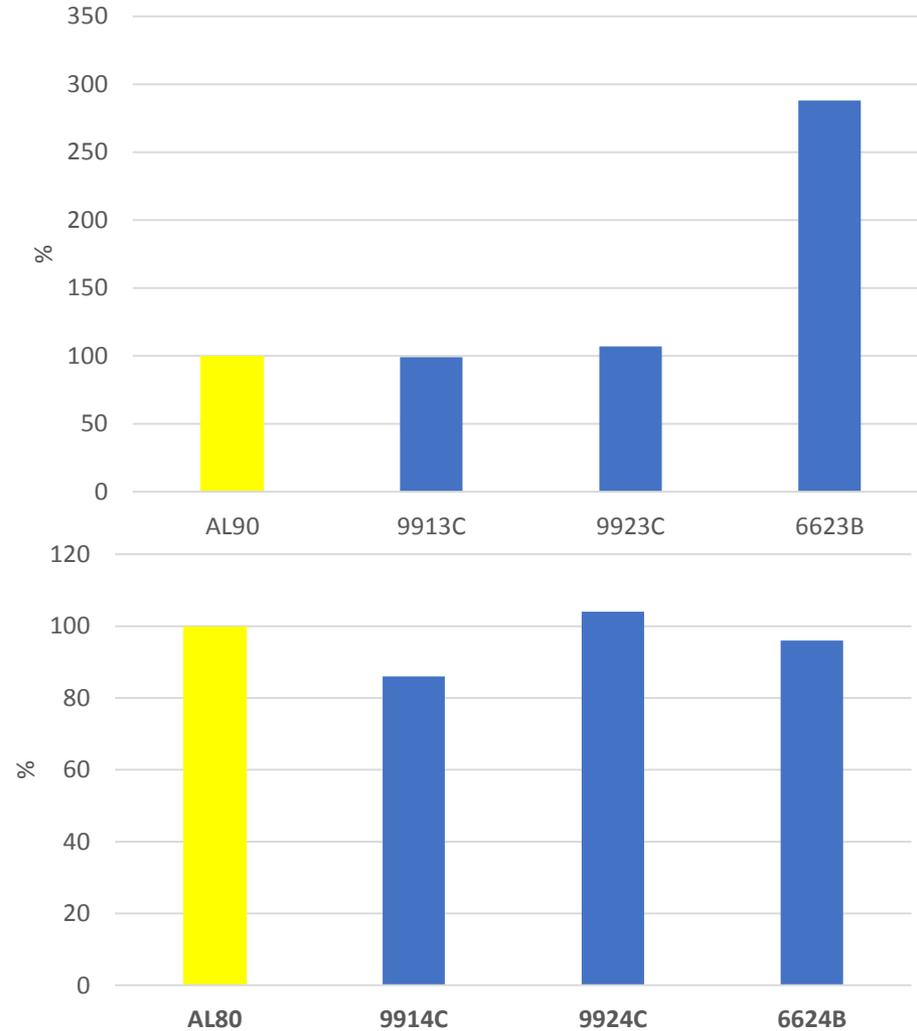
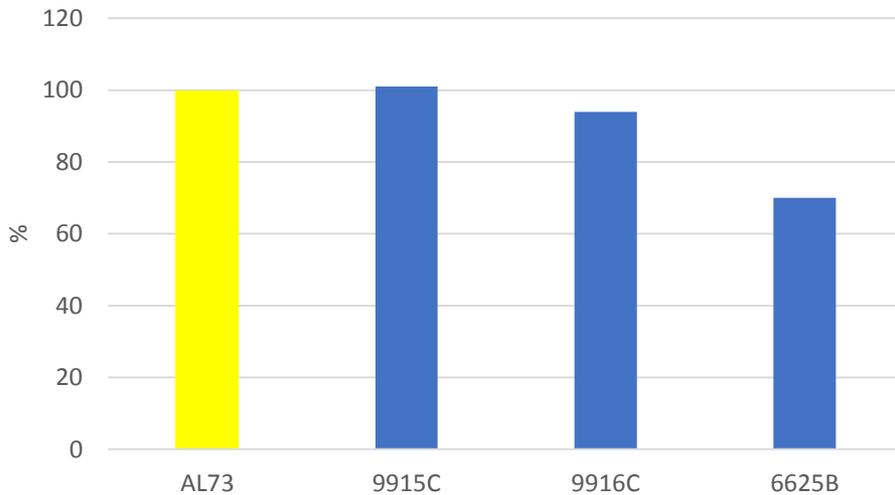


...como en tono reducido

Comparación de Poder Tintoreos*

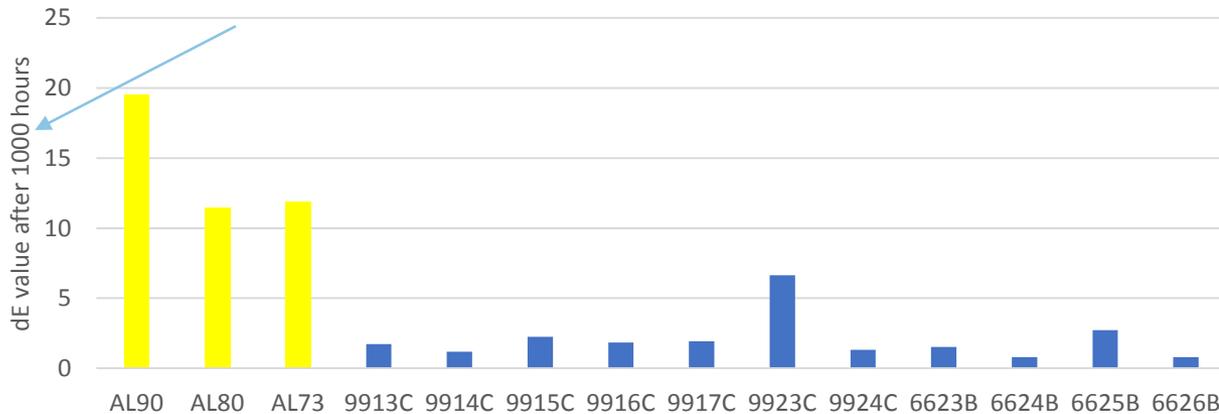
*Alkyd Melamine white reduction 1/9 (from AM coating 10% pigmentation)

Varias opciones con intensidad de color cercana

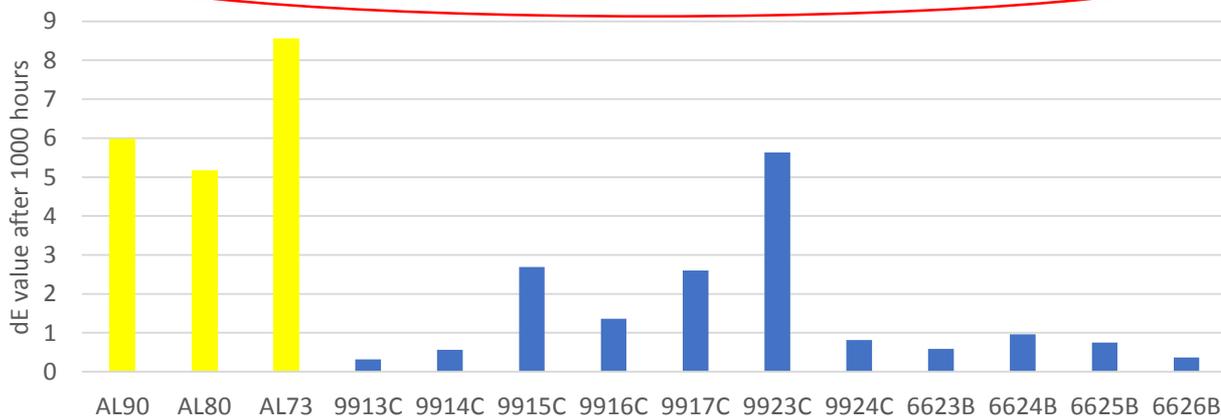


Comparación de Resistencia a la Intemperie

Weathering fastness Alkyd Melamine 10% pigmentation FS

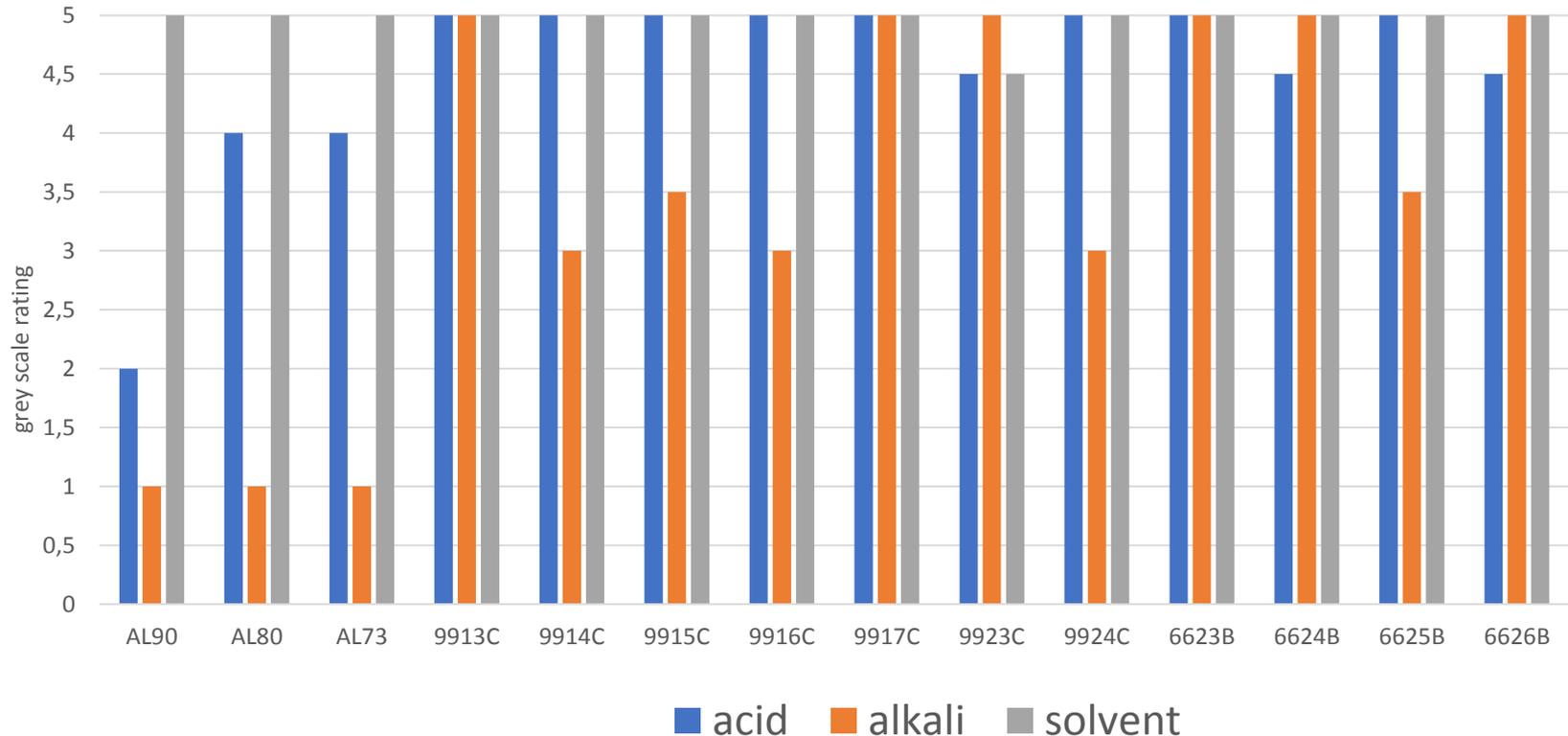


Weathering fastness alkyd melamine white reduction 1/9



Resistencia a la intemperie mejorada en comparación con los cromatos de plomo tanto tono pleno y en reducido

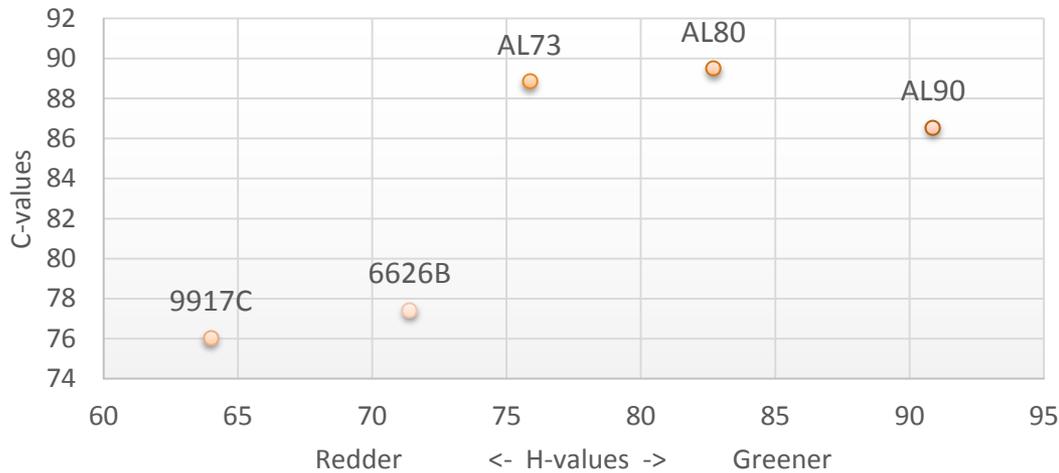
Comparación de resistencias a Acidos-Alcalis-Solventes.



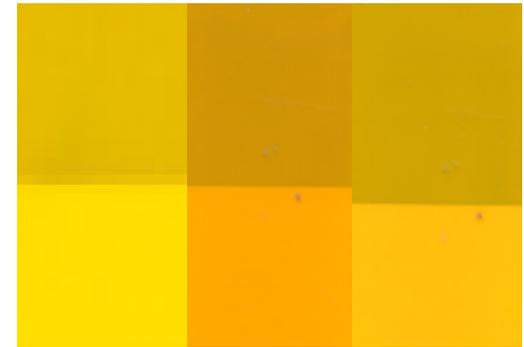
Resistencia a ácidos y álcalis mejorada en comparación con los cromatos de plomo. La resistencia a los solventes está al mismo nivel

Tono más rojizo disponible

Alkyd Melamine 10% pigmentation Full shade



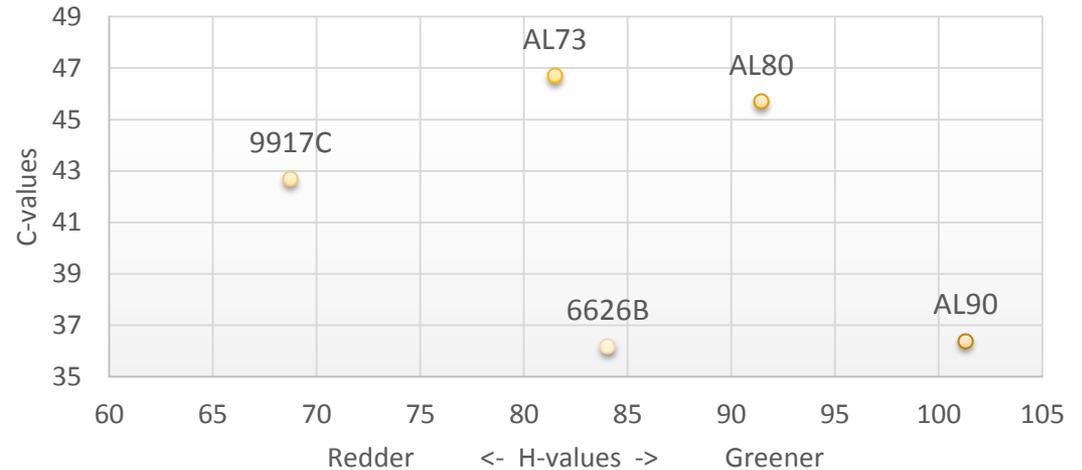
AL73 9917C 6626B



AL73 9917C 6626B

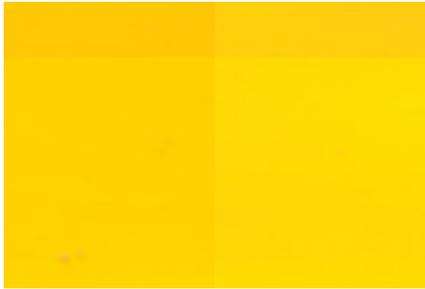


Alkyd Melamine white reduction 1/9

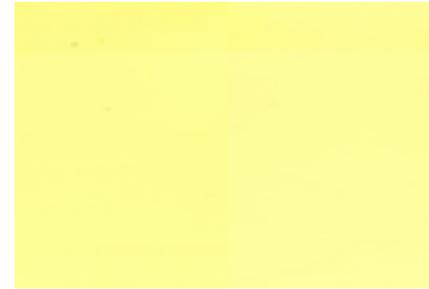


Gama de amarillos sistema base agua.

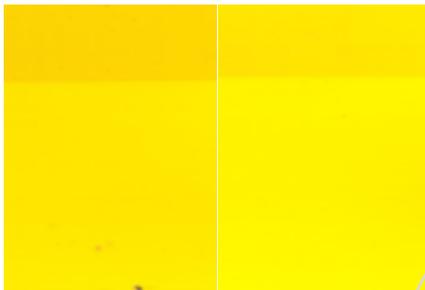
AL73* 6625B



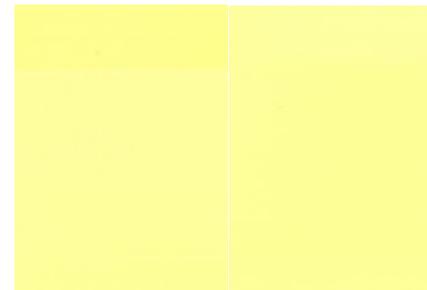
AL73* 6625B



AL80* 6624B



AL80* 6624B



AL90* 9913C 9923C 6623B



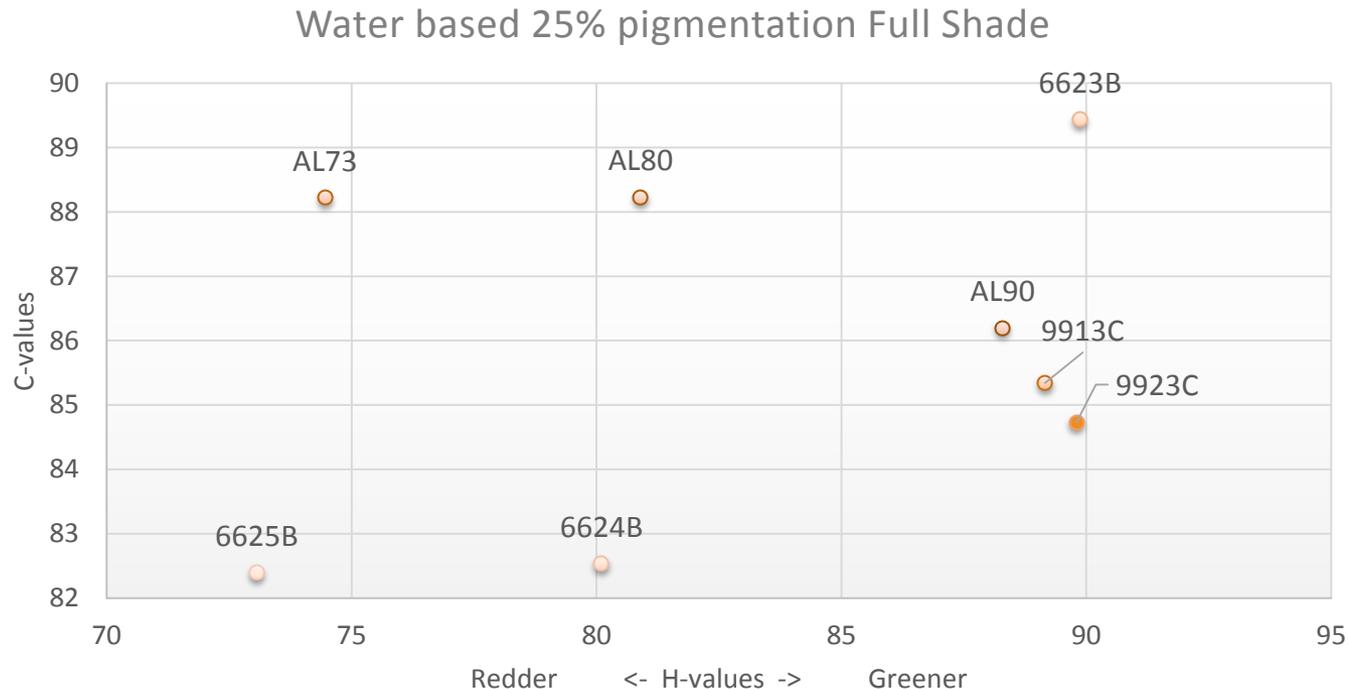
AL90* 9913C 9923C 6623B



* Ferro lead chromate references

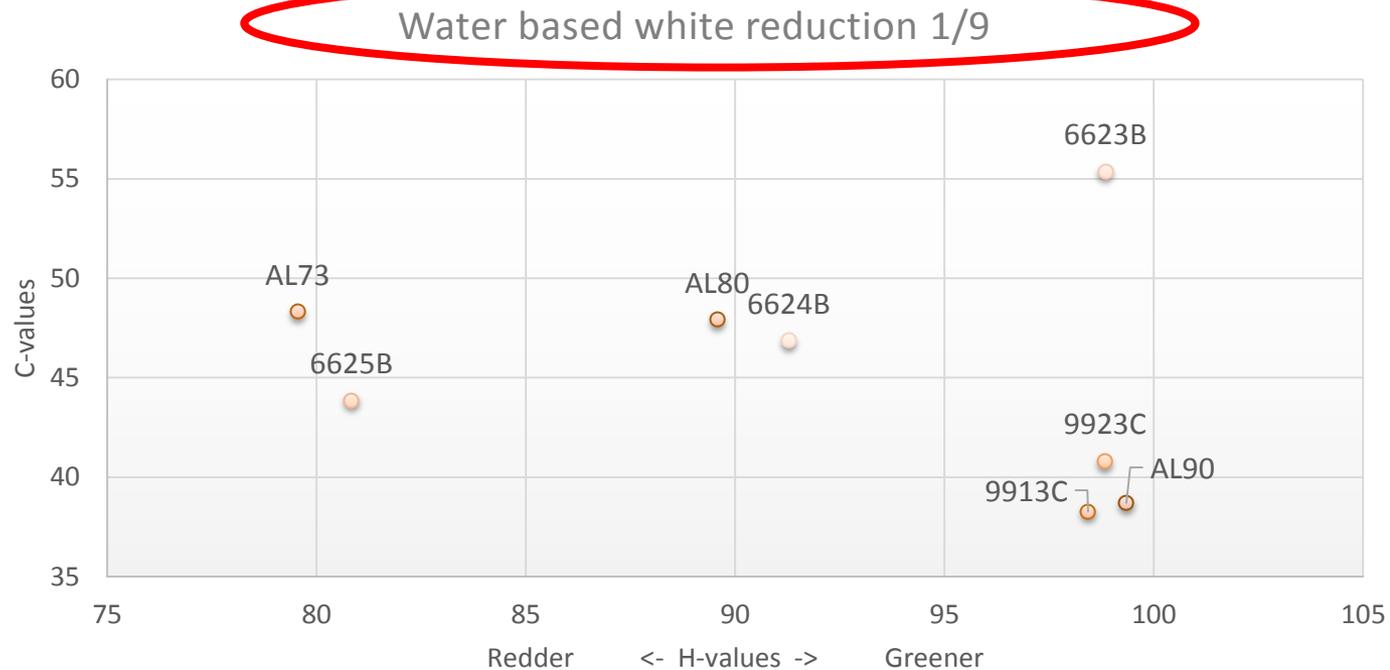
Water Based BT24 at 25% pigmentation

Lecturas Colorimétricas Base Agua BT24 Tono Pleno



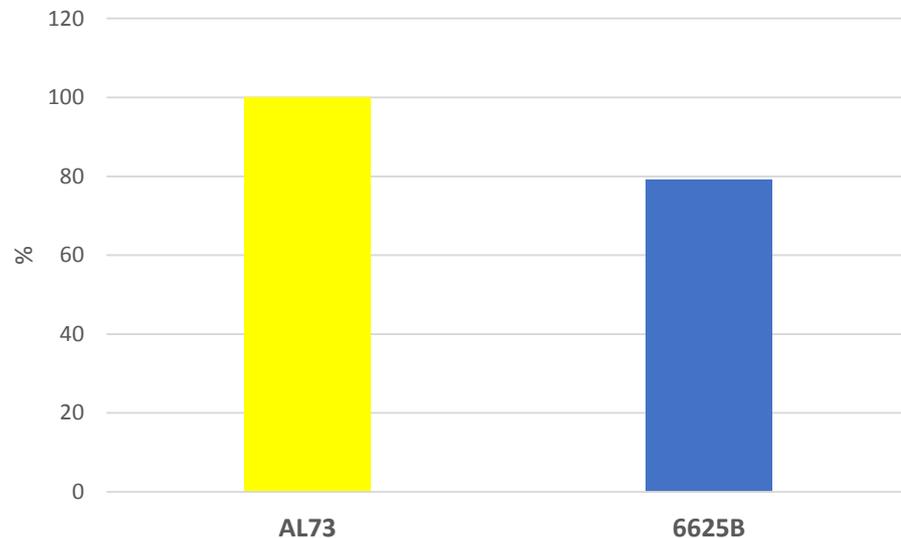
Para el espectro de amarillo las soluciones de color tienen alta aproximación de color en tono pleno y con una opacidad similar.

Lecturas Colorimétricas Base Agua BT24 Tono Reducido

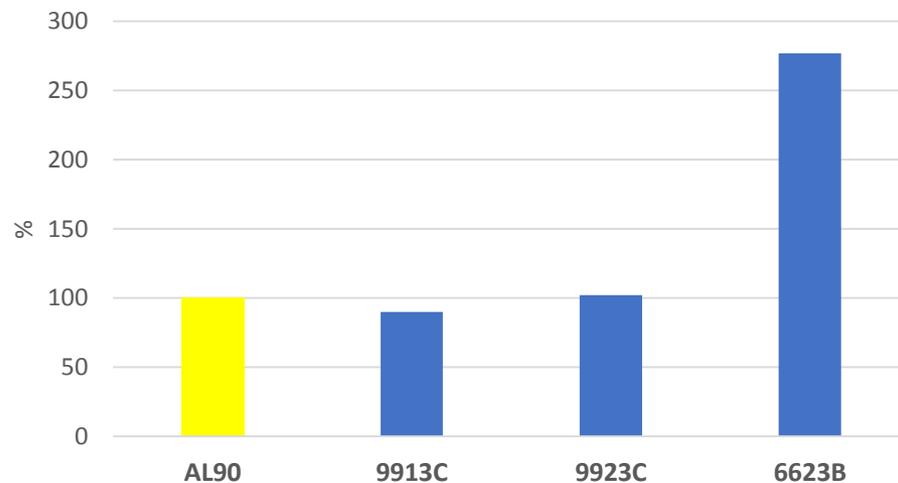
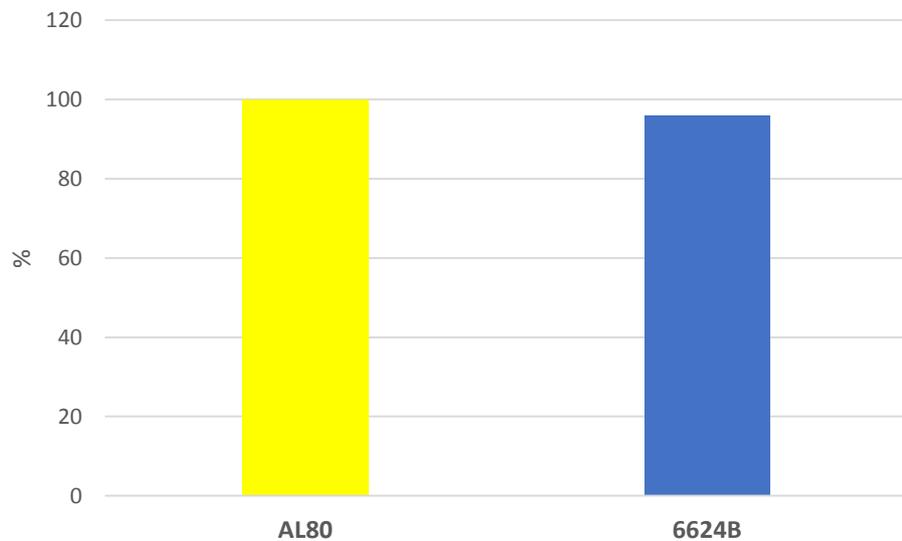


**También en tono reducido
mantiene las coincidencias
colorísticas cercanas**

Comparación de Poder Tintoreos*



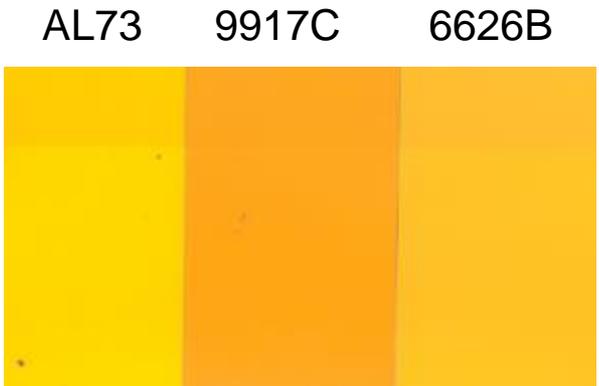
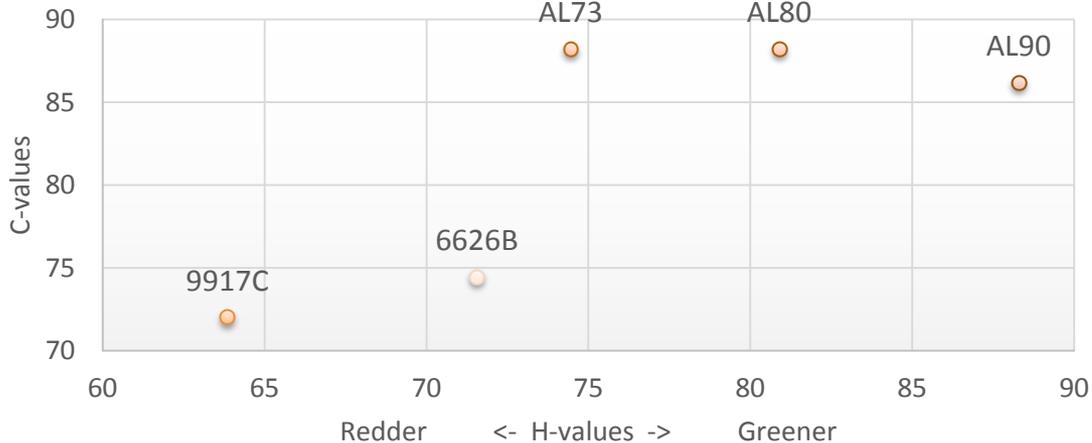
Esfuerzos de color muy cercanos



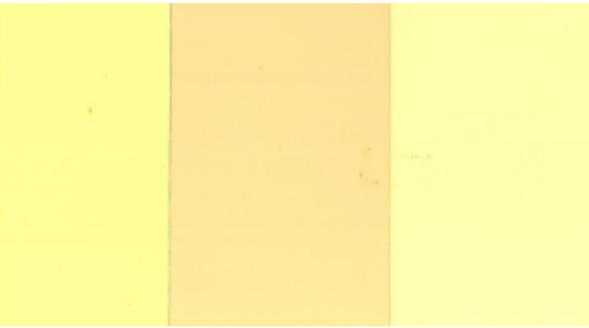
* Water based BT24 white reduction 1/9 (from water based coating at 25% pigmentation)

Tono más rojizo disponible. Base agua

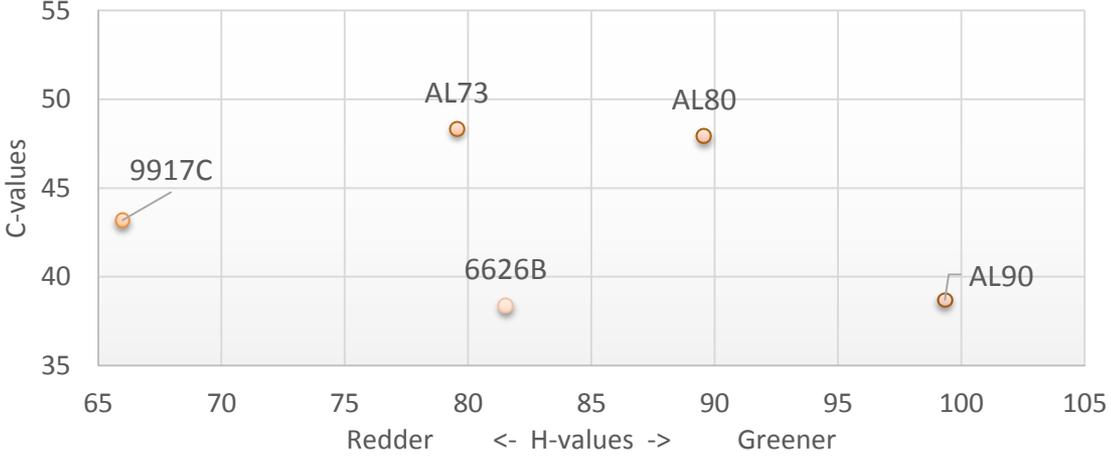
Water based 25% pigmentation Full Shade



AL73 9917C 6626B



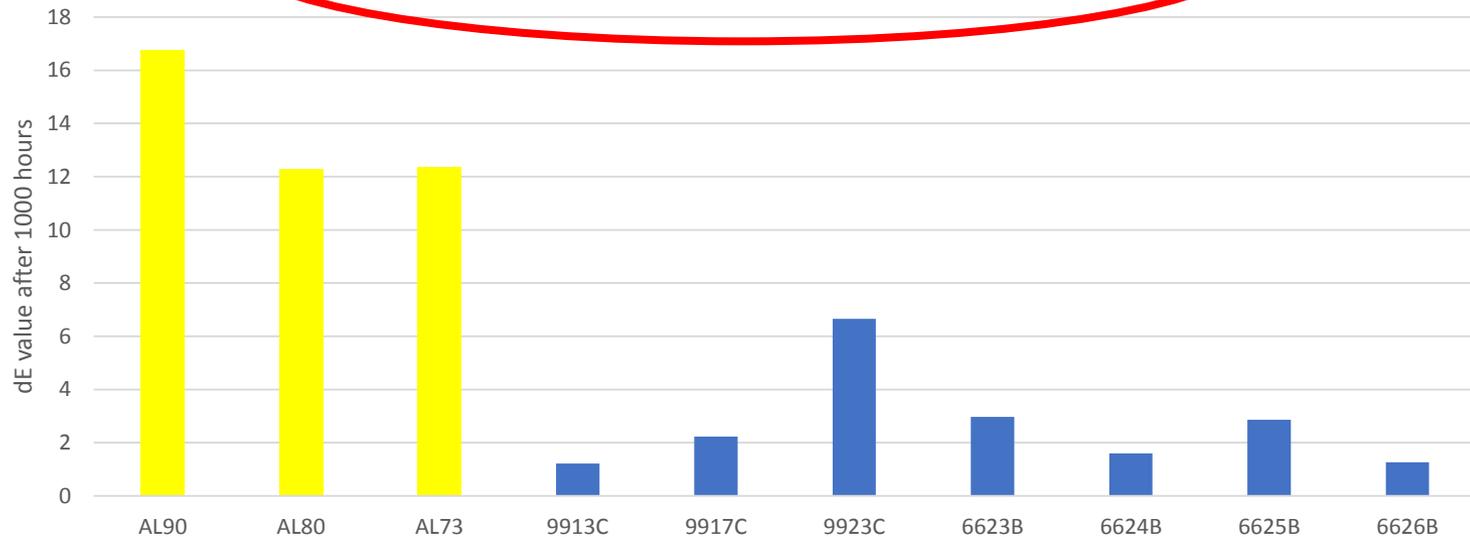
Water based white reduction



Comparación de Resistencia a la Intemperie

Mejor resistencia a la intemperie en comparación con los cromatos de plomo, evaluados en un sistema de látex a base de agua en tono reducido

Weathering fastness Water Based Latex white reduction 1/9



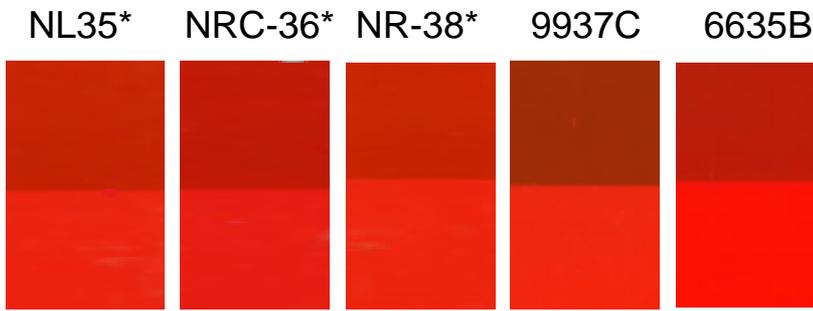


Eco-Lysopac Rojos

- Para remplazar Molibdatos de Plomo

Rojos en Base Solvente Alquid-Melamina Tono Pleno

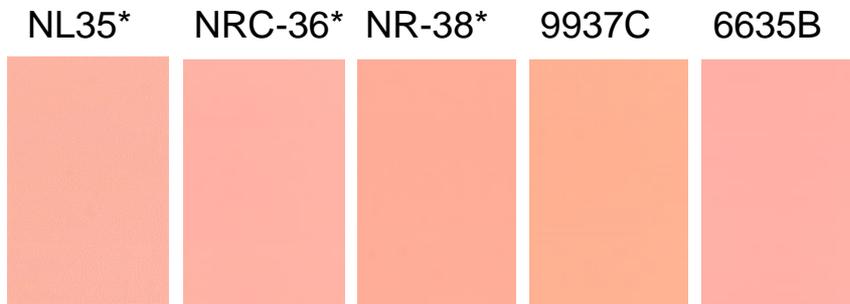
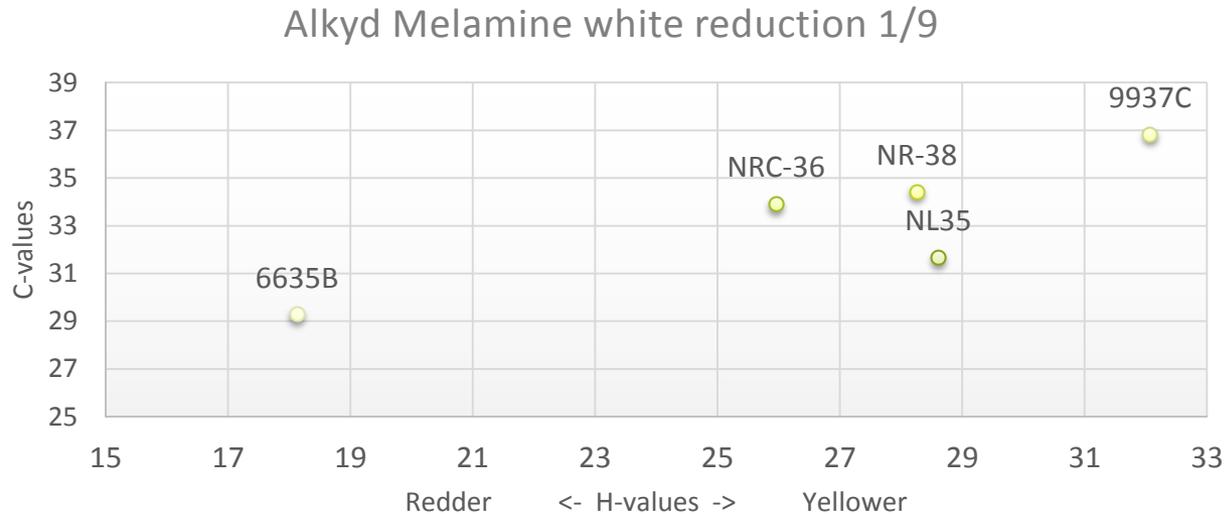
Alkyd Melamine 10% pigmentation Full Shade



*Ferro Lead molybdate references

**Opciones limitadas
pero suficientes para
cubrir los tonos
principales**

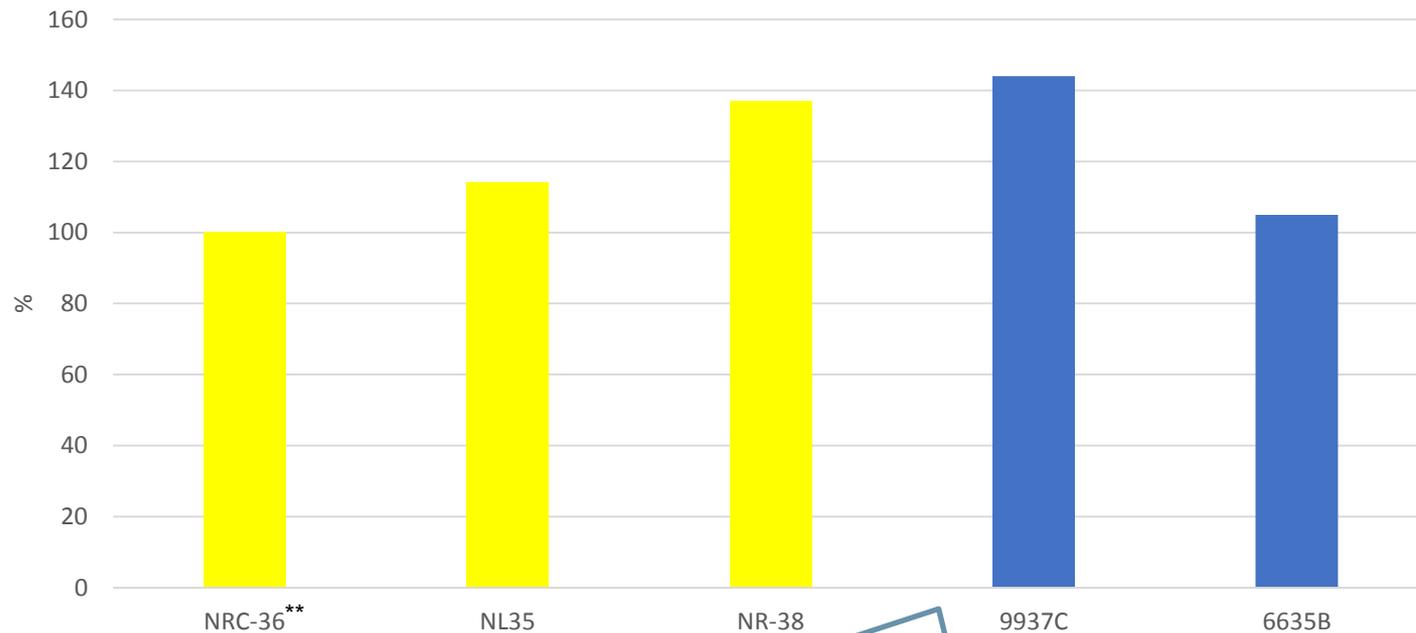
Rojos en alquid-Melamina Tono Reducido



Igual conclusión....

*Ferro Lead molybdate references

Comparación de Poder Tintoreos*

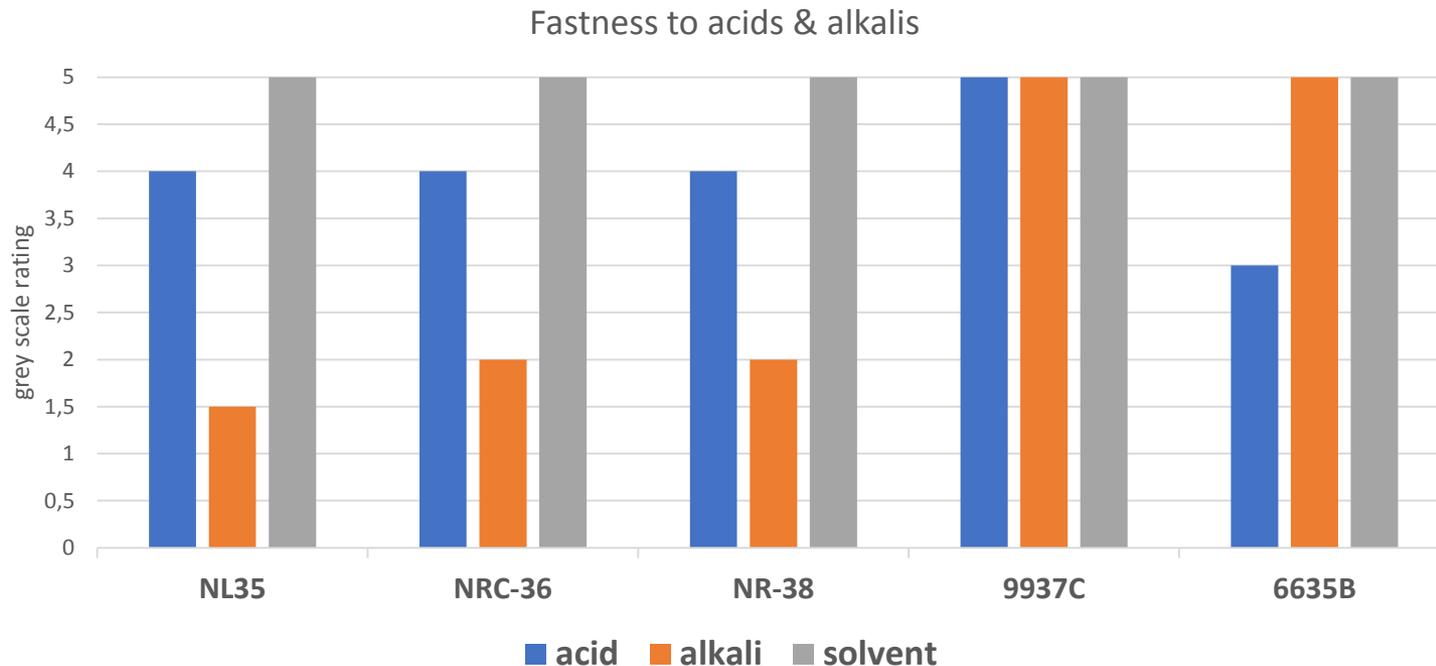


El poder tintoreo está en línea con los rojos de molibdeno

*Alkyd Melamine white reduction 1/9 (from AM coating at 10% pigmentation)

** tinting strength reference

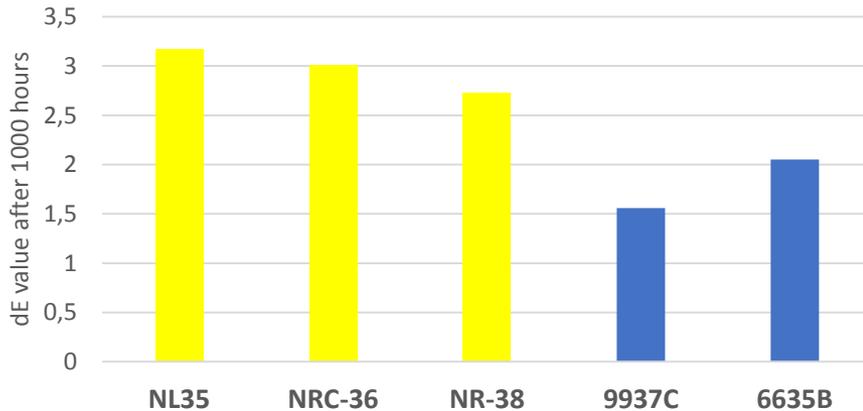
Comparación Resistencias Acidos -Alcalis- Solventes



Buena resistencia a acidos, alcalis y solventes en comparación a los molibdatos de plomo.

Comparación de Resistencia a la Intemperie

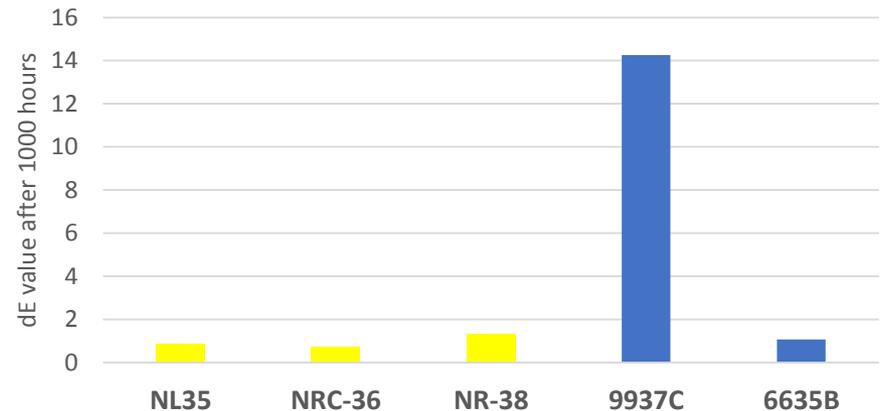
Weathering fastness alkyd melamine 10%
pigmentation **TONO PLENO**



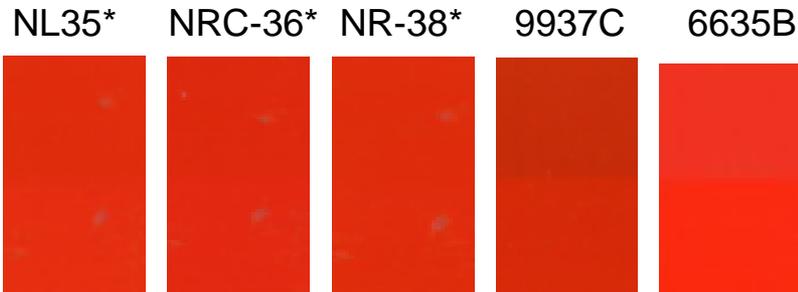
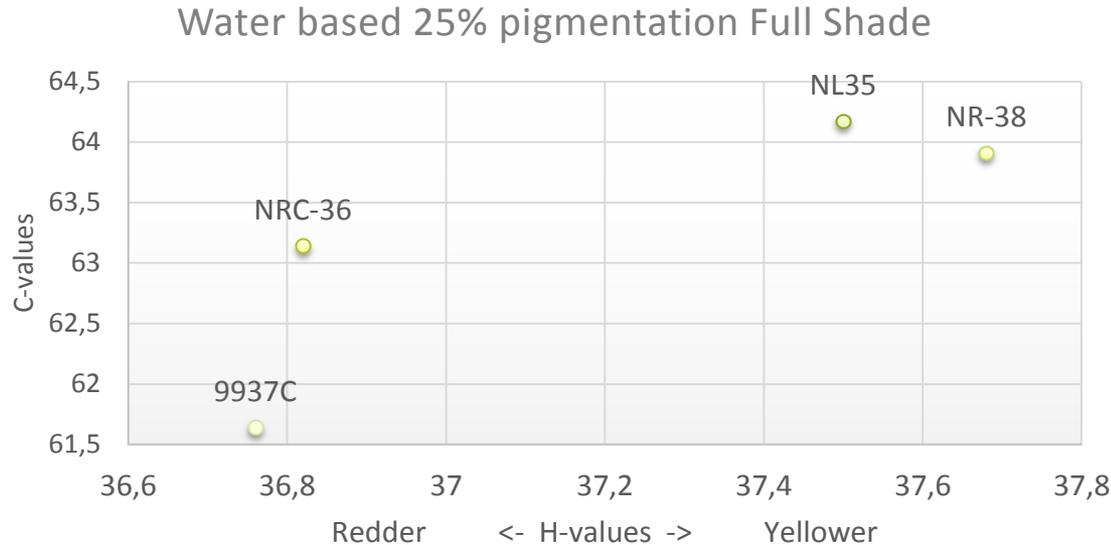
Poseen buena resistencia a la intemperie en tono pleno, pero...

...en tono reducido no es el mismo comportamiento para el 9937C

Weathering fastness alkyd melamine white
reduction 1/9 **TONO REDUCIDO**



Rojos en Base Agua Tono Pleno

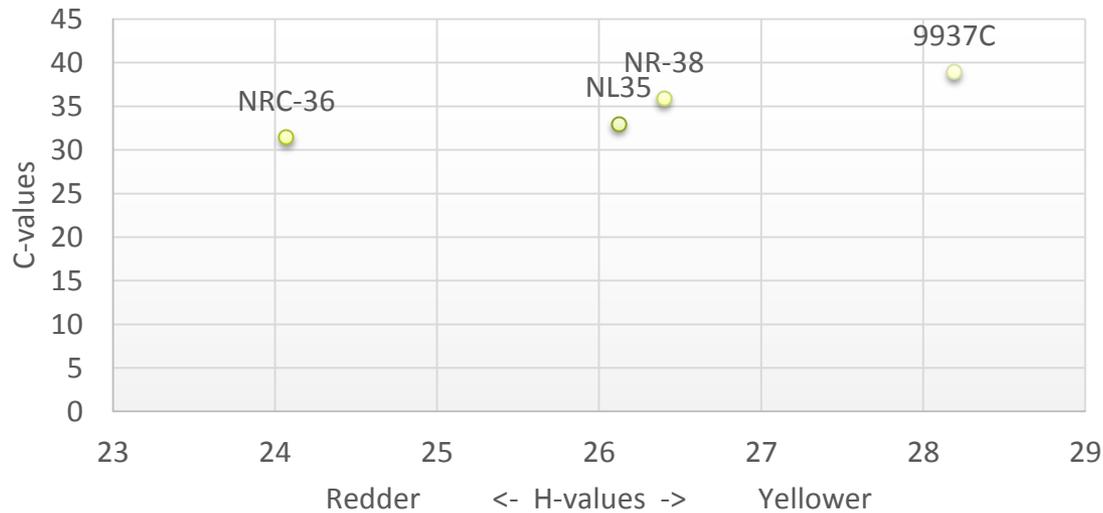


**Opciones limitadas
pero suficientes para
cubrir los tonos
principales**

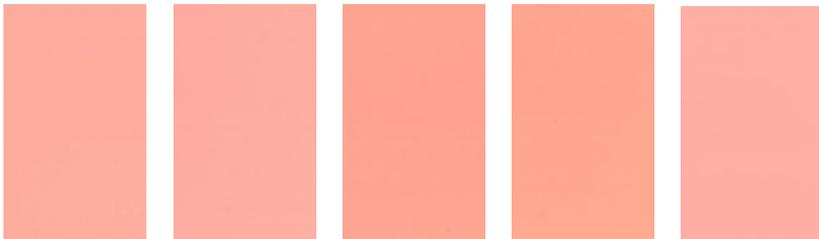
*Ferro Lead molybdate references

Rojos en Base Agua Tono Reducido

Water based white reduction 1/9



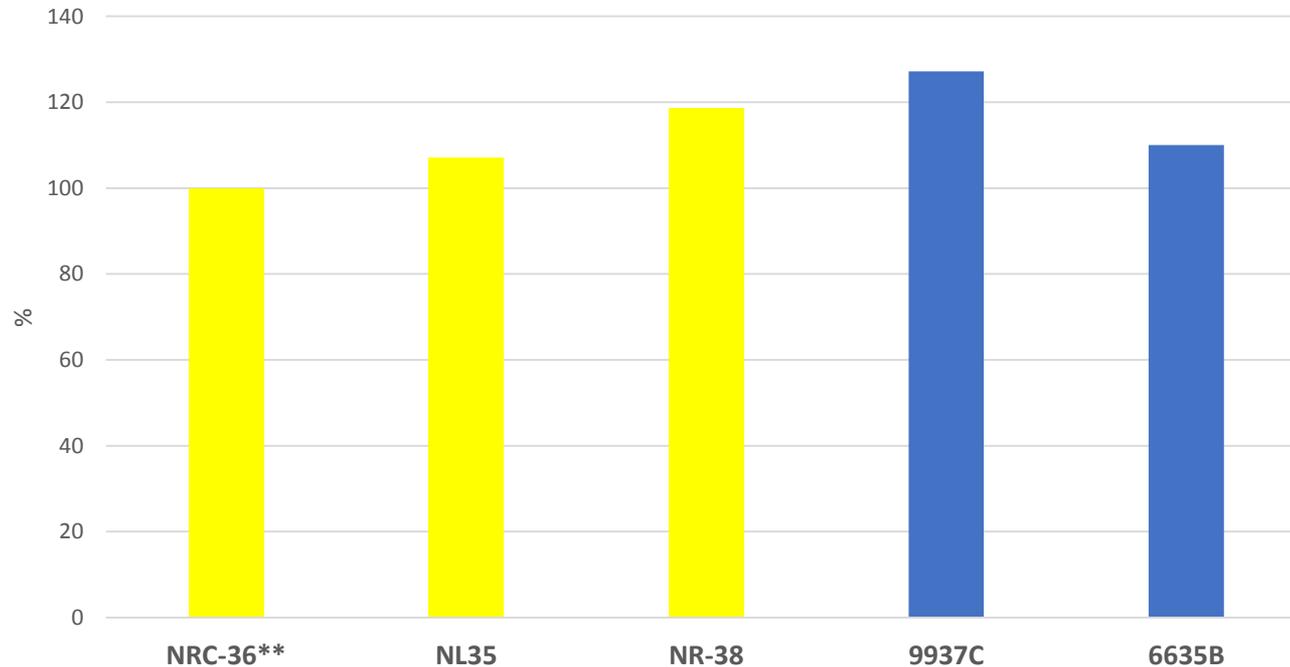
NL35* NRC-36* NR-38* 9937C 6635B



....igual conclusion

*Ferro Lead molybdate references

Comparacion de Poder Tintoreo*



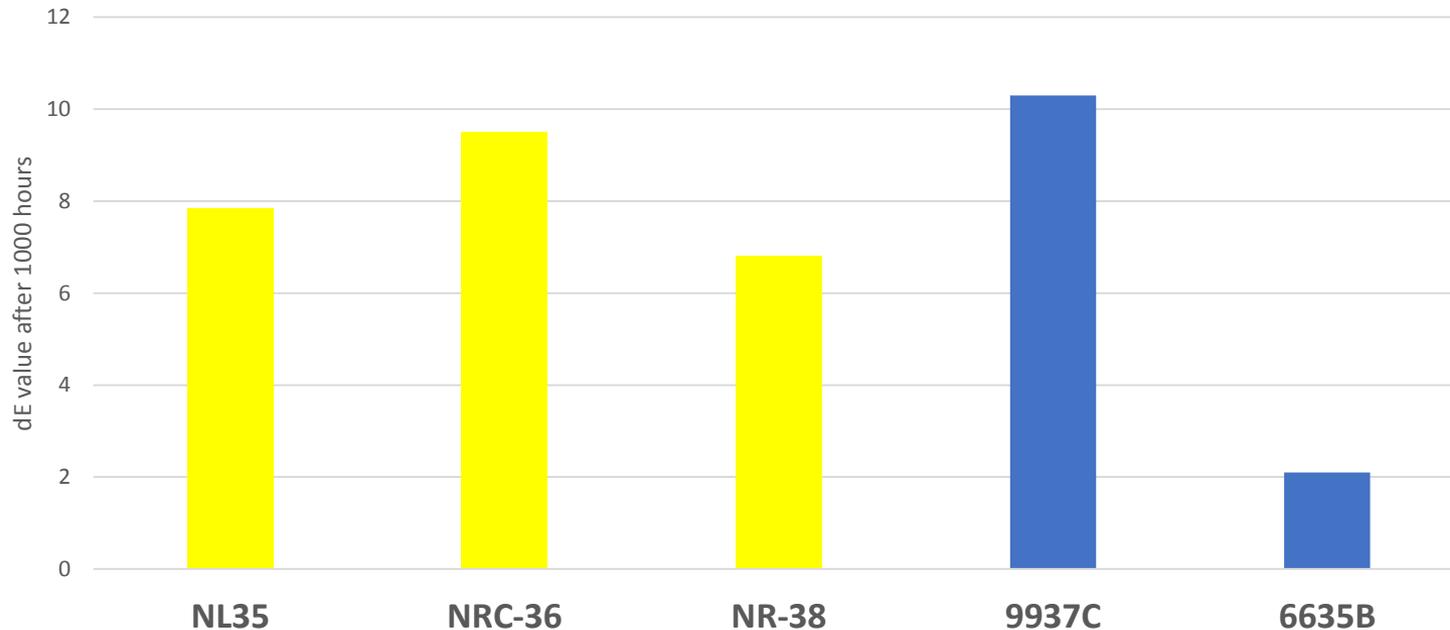
El poder tintoreo está en línea con los rojos de molibdeno

Water based BT24 white reduction 1/9 (from water based coating at 25% pigmentation)

29 ** tinting strength reference

Comparación de Resistencia a la Intemperie

Weathering fastness Water based Latex white reduction 1/9



Resultados similares en resistencia a la intemperie para 9937C y un rendimiento mucho mejor para 6635B



Conclusiones

Descripción General por Aplicación

	decorative coatings		industrial coatings			car refinish	OEM
	solvent based	water based	solvent based	water based	powder coatings		
AL90	X		X	X	X	X	
AL80	X		X	X	X	X	
AL73	X		X	X	X	X	
9913C	X	X	X	X	X	X	X
9914C	X		X		X	X	
9915C	X		X		X	X	
9916C	X		X		X	X	
9917C	X	X	X	X	X	X	
9923C	X	X	X	X	X	X	
9924C	X		X		X	X	
6623B	X	X	X	X	X	X	X
6624B	X	X	X	X	X	X	X
6625B	X	X	X	X	X	X	X
6626B	X	X	X	X	X	X	X
NL35	X	X	X	X	X	X	
NRC-36	X	X	X	X	X	X	
NR-38	X	X	X	X	X	X	
9937C	X	X	X	X	X		
6635B	X	X	X	X	X	X	X

Conclusiones

- ▶ Una gama completa de amarillos y rojos para reemplazar los cromatos de plomo y – molibdatos
- ▶ Con buen desempeño en
 - Tono Pleno
 - Brillo
 - Poder tintóreo
 - Opacidad
 - Proceso
- ▶ Ofreciendo en la mayoría de los casos un comportamiento superior en:
 - Resistencia a la luz e intemperie
 - Resistencia a ácidos y álcalis y solventes

About Ferro Corporation

www.ferro.com

Ferro Overview

- Founded 1919 as Ferro Enameling Company in Cleveland, Ohio USA
- A leading producer for glass, metal, ceramic and other substrates and color solutions in the form of specialty pigments and colorants for a broad range of industries and applications
- Approximately 5,900 associates working in 30 countries
- 2019 sales of \$1.0 billion



Diverse Customer Base, Singular Promise

- We serve manufacturers in 100+ countries and in diverse markets.
- Our customers turn to us for innovative solutions and a commitment to delivering *new possibilities for their products, businesses and customers.*

**Building and
Construction**

Automotive

Appliances

Electronics

**Household
Furnishings**

**Industrial
Products**

Ferro's Core Technologies

- Color and glass science
- Particle engineering
- Surface application technology
- Formulation



The Way We Work: Ferro Core Values

Customer Focus

Our customers are why we exist; we build trusting relationships that are built on customer needs and a genuine interest in making customers successful.

Accountability for Performance

We work to the highest performance standards, prioritizing safety, environmental stewardship, creating value for customers and Ferro shareholders.

Innovative Thinking

We seek new ideas for technologies and business processes, always looking for ways to improve and better serve our customers.

Teamwork and Collaboration

We are committed to a work environment of trust and respect, and work together to consistently deliver value to our customers and shareholders.

Inquietudes?

For more information on
Color Solutions - Ferro Pigments Business Unit,
visit: ferro.com/pigments-and-dispersions



CONTACTOS EN LA REGION.

COLOMBIA

ivan.herrera@ferro.com

john.arboleda@ferro.com

ECUADOR –PERU-ARGENTINA-CHILE-BOLIVIA- URUGUAY

luis.peluffo@ferro.com

BRASIL

marcelo.defreitas@ferro.com / denison.novak@ferro.com

MEXICO

alejandra.acevedo@ferro.com / cesar.gonzalez@ferro.com

CENTROAMERICA-CARIBE

john.arboleda@ferro.com