



The applications, benefits and limitations of inorganic pigments when used to through-colour architectural concrete




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Technical Sales Representative
LANXESS Inorganic Pigments

X BAYFERROX®
Color for Life.

Today's agenda

- 1 Introductions to inorganic pigments and applications
- 2 Technical considerations
- 3 Colored Concrete Works Award and case studies








LANXESS – a globally operating specialty chemicals company

	<p>Specialty chemicals company</p> <ul style="list-style-type: none"> Spin-off from Bayer in 2004 Specialty chemicals portfolio: plastics, rubber, intermediates and specialty chemicals
	<p>Global success story</p> <ul style="list-style-type: none"> 75 sites worldwide Approximately 19,200 employees in 25 countries Global sales of €9.6 billion in 2016
	<p>Strategy of profitability and resilience</p> <ul style="list-style-type: none"> Enhancing its leading position in mid-sized markets

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LANXESS Inorganic Pigments – World's leading iron oxide producer with a wide range of services provided by the Global Competence Centres

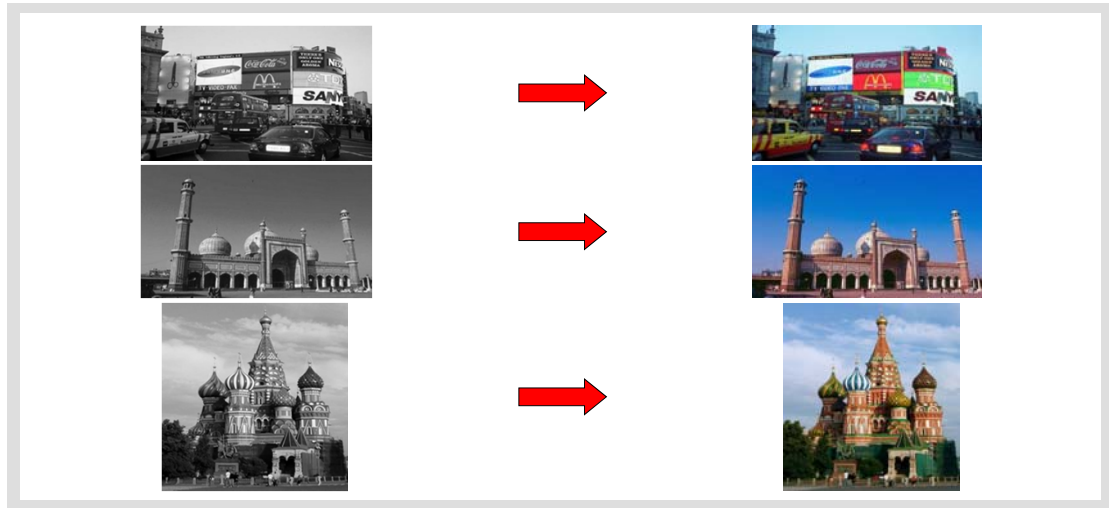
<p>LANXESS Inorganic Pigments</p> <ul style="list-style-type: none"> Production capacity: ~ 375,000 t/a Employees: ~ 1,700 Customers: ~ 4,500 Product groups: Iron oxide (red, yellow, black, brown) Chromium oxide (green) Growth drivers: Urbanization, Sustainability, Innovation Main brands: <div style="text-align: center;">    </div>	<p>Global Competence Centers</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  Construction </div> <div style="text-align: center;">  Paints & Coatings </div> <div style="text-align: center;">  Colour Specialties </div> <div style="text-align: center;">  Technical Oxides </div> </div> <table border="1" style="width: 100%;"> <tr> <td> <p>Customer Service</p> <ul style="list-style-type: none"> Advice on the proper use of IPG products Evaluation of complaints </td> <td> <p>Testing Center</p> <ul style="list-style-type: none"> Testing and evaluation Colour matching trials </td> </tr> <tr> <td> <p>Consulting Service</p> <ul style="list-style-type: none"> Development of customised solutions </td> <td> <p>Trend Monitoring</p> <ul style="list-style-type: none"> Monitoring of trends </td> </tr> </table>	<p>Customer Service</p> <ul style="list-style-type: none"> Advice on the proper use of IPG products Evaluation of complaints 	<p>Testing Center</p> <ul style="list-style-type: none"> Testing and evaluation Colour matching trials 	<p>Consulting Service</p> <ul style="list-style-type: none"> Development of customised solutions 	<p>Trend Monitoring</p> <ul style="list-style-type: none"> Monitoring of trends
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LANXESS is the market leader for coloured inorganic pigments

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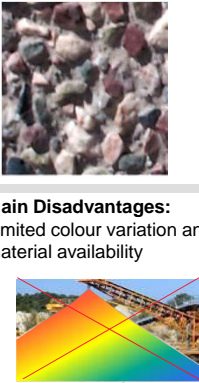
Without colour our life and surroundings would be dull and grey

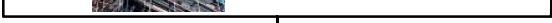


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How to colour construction materials?

Coating	Coloured Aggregates	Pigments
<p>Disadvantages: Limited durability → maintenance costs</p> 	<p>Main Disadvantages: Limited colour variation and material availability</p> 	<p>Advantages:</p> <ul style="list-style-type: none"> • Maximum flexibility • Wide variety of colours available • Superior durability and performance in construction materials


Limited possibilities

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The most important oxide pigments for construction

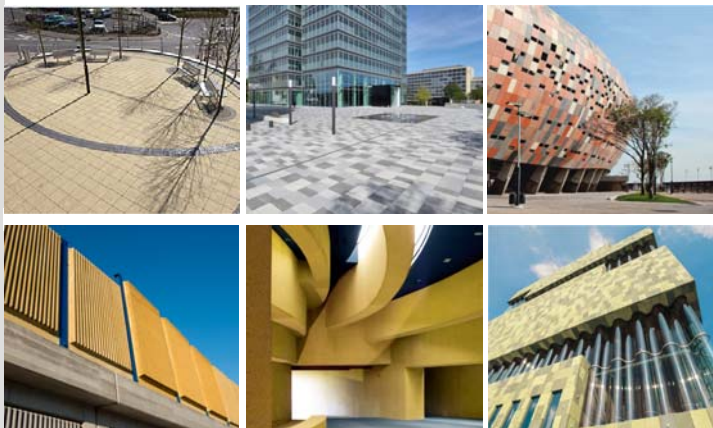
Color	Name	LANXESS pigment
Black	Iron oxide black	Bayferrox® Black
Red	Iron oxide red	Bayferrox® red
Yellow	Iron oxide yellow	Bayferrox® yellow
Brown	Iron oxide brown	Bayferrox® brown
Green	Chrome oxide green	COLORTHERM® Green
Blue	Cobalt blue	
White	Titanium dioxide	

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Applications in the Construction Industry

QUALITY SHAPES



LANXESS Bayferrox pigments shape our surroundings

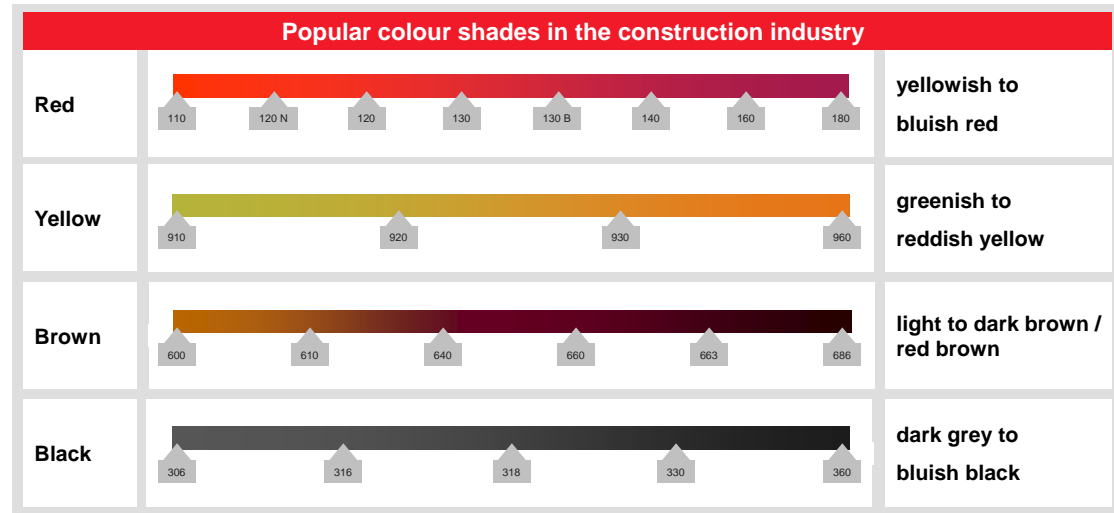
Supported applications

- Concrete paving blocks
- Concrete slabs
- Facades
- Precast elements
- In-situ concrete
- GRC Panels

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The Bayferrox® Pigments commonly used in building materials cover all the most popular colours



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1 Introductions to inorganic pigments and applications

2 **Technical considerations**

3 Colored Concrete Works Award and case studies

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What are the main variables that effect the colour shade and the durability of coloured concrete?

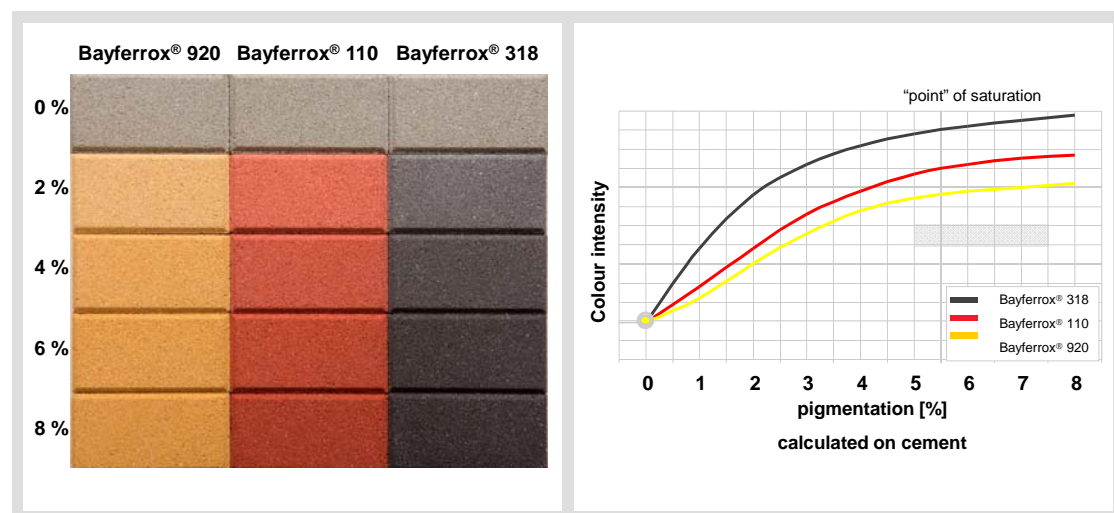
Technical considerations

- Pigment concentration
- Aggregate colour
- Natural colour of cement
- Water/ cement ratio
- Efflorescence
- Non stable organic pigments

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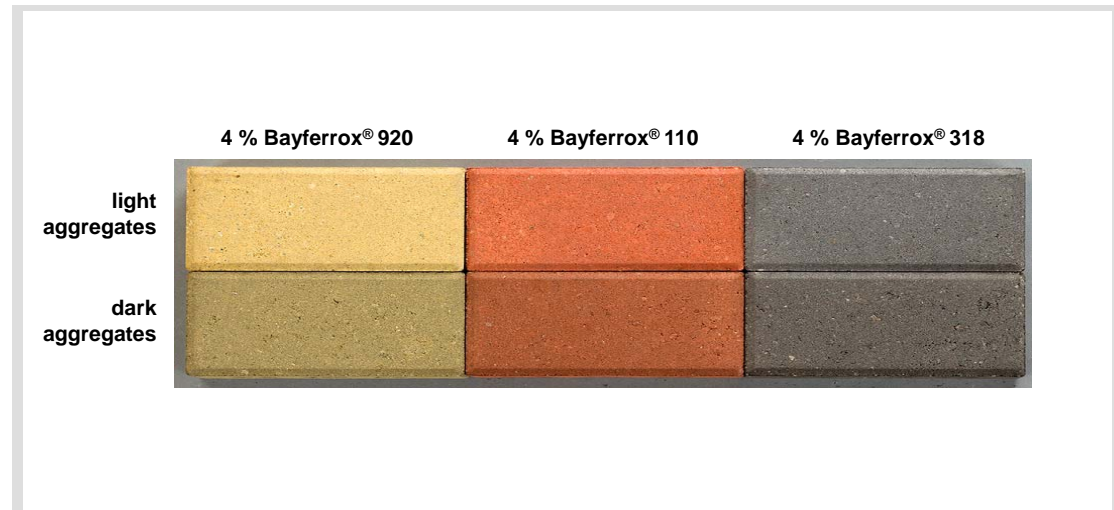
Influence of the pigmentation level on the final colour shade



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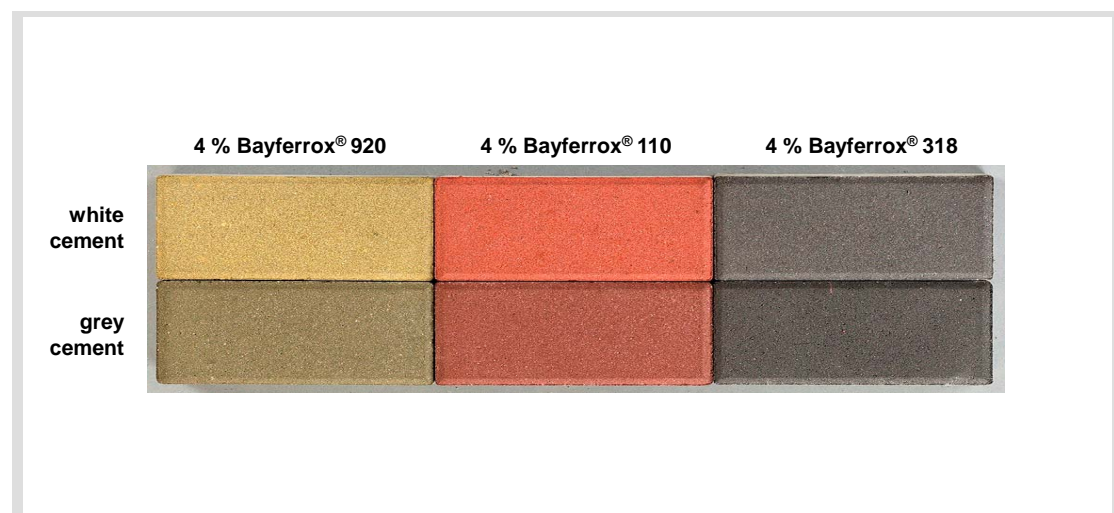
Influence of the aggregate colour on the final colour shade



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Influence of the cement colour on the final colour shade



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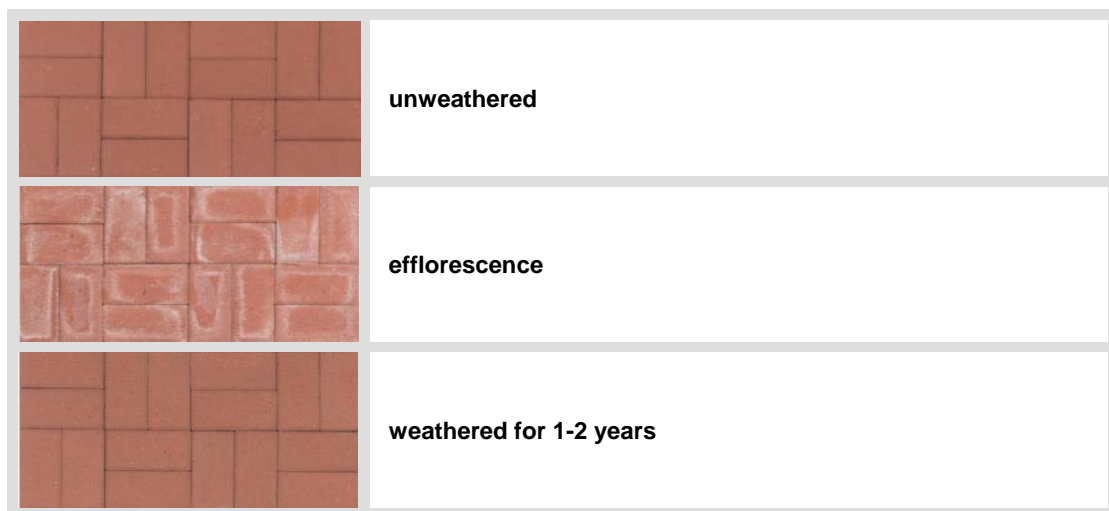
Influence of the water/cement-ratio on the final colour shade



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Efflorescence on concrete: a temporary problem



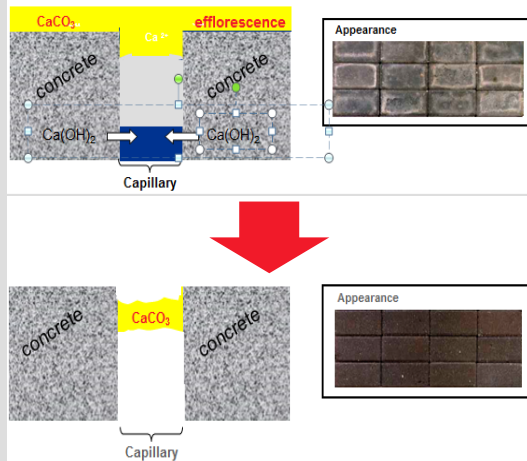
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But what exactly is efflorescence?

Efflorescence is a natural phenomenon

- Caused by the formation of free lime when the cement sets.
- Water in the form of rain penetrates the concrete and dissolves the lime where it migrates to the surface.
- The water evaporates leaving a white lime haze which is not readily soluble.
- Rain and other elements washes the lime away over time.
- Bayferrox pigments neither cause nor prevent it



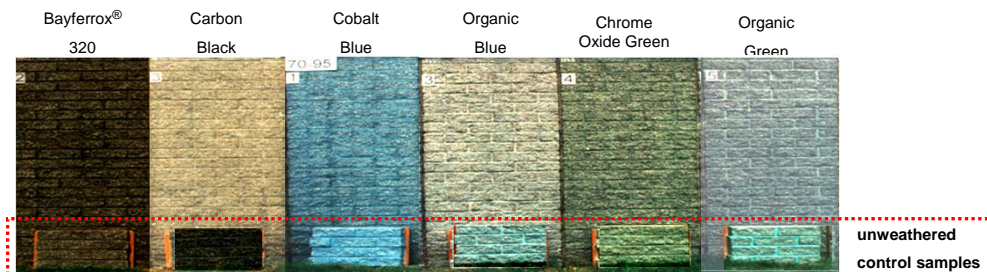
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Non-stable organic pigments

Whilst organic pigments can initially offer very attractive looking colours in concrete.....

Concrete masonry blocks, outdoor weathered



.....once exposed to the elements they will fade

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What are the main variables that effect the colour shade and the durability of coloured concrete?

Technical considerations

- Pigment concentration
- Aggregate colour
- Natural colour of cement
- Water/ cement ratio
- Efflorescence
- Non-stable organic pigments



Consistency is key to a successful project.

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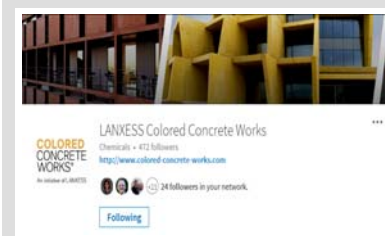
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Colored Concrete Works®



COLORED CONCRETE WORKS®

An initiative of LANXESS

www.colored-concrete-works.com

CCW LinkedIn focus page



Aim of the initiative:

- Valorisation of concrete as a building material by colouring it with attractive colours
- Improving the material in a sustainable manner and increasing the value of premises
- Presentation of internationally acclaimed architects

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LANXESS Colored Concrete Works Award



- The Colored Concrete Works Award is to be awarded to architects who have distinguished themselves in the use of colour in concrete buildings.
- The international jury comprises of architects, representatives of the trade press and university community, and pigment and marketing experts from the LANXESS Inorganic Pigments (IPG) business unit.
- Criteria include the building's choice of colours, function and significance. The most important criteria for participating: Buildings must be no more than five years old, and the concrete used must be coloured with inorganic iron oxide or chromium oxide pigments.

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LANXESS Colored Concrete Works Award



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Case Study: CCW Award, 1st Place 2017

Object

Musee des Civilisations de l'Europe et de la Mediterranée (MuCEM), Marseille, France

Architect

Rudy Ricciotti, Marseille

Pigment

Bayferrox® 318 and 330 black



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Case Study: CCW Award, 1st Place 2015

Object

Alp, apartment house in Akabane,
Tokyo, Japan

Architect

Akihisa Hirata, Tokyo

Pigment

Bayferrox® 4330/3 black



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Case Studies: CCW Award, 1st Place 2012


Object

Ciudad de la Justicia, Barcelona, Spain

Architect

David Chipperfield Architects & B720 Arquitectos

Pigmente

Bayferrox®130, 960, 660, 330, 920, Colortherm®Green



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Case Studies



Object
ESO Hotel, Cerro Paranal, Chile

Architect
Auer&Weber, Munich

Pigment
Bayferrox® 600 N red



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Case Studies

Object
Town Hall Middelburg, Netherlands

Architect
Rau, Amsterdam

Pigment
Bayferrox® 330 black



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Case Studies



Object

Casa das Histórias Paula Rego,
Cascais, Portugal

Architect

Eduardo Souto de Moura

Pigment

Bayferrox® 110 and 420



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Case Studies



Object

Bogeda Antion

Architect

Jesús Marino PASCUAL




Pigment

Bayferrox® 920

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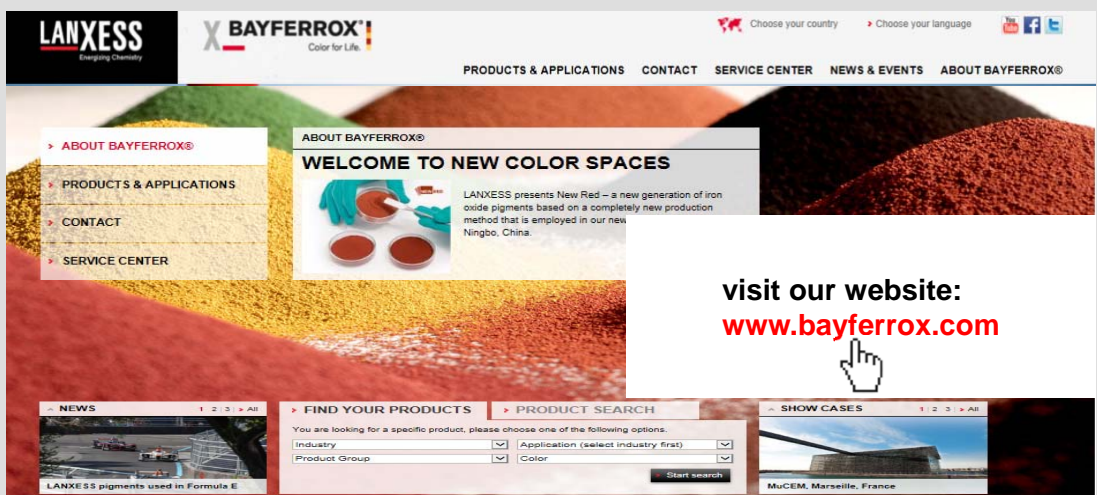
Colored Concrete Works Award 2019

<p>2012 - Ciudad de la Justicia</p> 	<p>2015 – Alp</p> 
 <p>2017 – MuCem</p>	<p>Could it be you?</p> <p>2019 - from the UK?</p>

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Further information?



visit our website:
www.bayferrox.com

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