standothek

Perfect colour management.

STANDOX

The Art of Refinishing.

Find the right shade.

White is not always white, and red is not always red. The huge variety of colours and nuances makes it more and more difficult for the refinisher to find the right shade.

At the beginning of the 1970s about 7,000 colours were still enough to cover the colour spectrum. Today however there are more than 60,000 colours available at Standox alone and the number is growing every day. On average 6–7 new colours are created for each car brand each year.

Up to 1000 new colours emerge every year worldwide on our streets, in addition to their – sometimes numerous – variants. Hence, the challenges for refinishers in finding the right colour and determining the correct mixing formula are also increasing.

With the constantly increasing number of mixing formulae, the available aids and appliances have also been further developed and substantially improved. Professional colour documentation, electronic colour-measuring devices and effective software make finding colours considerably easier. Despite these modern aids, achieving a flawless refinishing depends decisively on the refinisher's expertise. As he and his client will only be hundred per cent satisfied with the paint result, if he has found the right colour.

Contents.

How colours are created.

Have you ever asked yourself what colour actually is?
Colour is a property of light which originates through reflection or absorption.

Colour is therefore an effect that every person perceives individually. In order for this to occur, three things are needed:

- Light,
- a surface which reflects or absorbs the light,
- a receptor that absorbs the reflected light, for example, the eye.

The colour of a surface is perceived in its colour, because it only reflects the components of the entire light colour spectrum which correspond to the colour of the object.

This means, for example, that a red surface reflects light of this wavelength (see also little colour science) and "swallows" (absorbs) the rest.

Exceptions are white and black. In the case of a white surface, the entire colour spectrum of the light is reflected and we see white. The exact opposite occurs with black surfaces; the light is absorbed and the eye perceives black.

This behaviour is based on the basic properties of light. Light is an electro-magnetic radiation of different wavelengths. The visible light can be represented with a prism in the colours of the rainbow or the spectral colours. Above and below this light component lie the ultraviolet and infrared range, which cannot be seen by the human eye.

Light falls on a red surface. The component of the colour spectrum is reflected, the remaining light is absorbed.

Light falls on a white surface. The complete colour spectrum is reflected.

Light falls on a black surface. The complete colour spectrum is absorbed.

A little colour science.

Colour.
Physically and anatomically justified sensory impression.

Wavelength.
The wavelength of the electromagnetic radiation defines visible/invisible colours. The distance between two neighbouring wave peaks is indicated in nanometre (nm).

Light.
Electromagnetic radiation in the wave range between 400 nm (blue) and 800 nm (red.)

Ultraviolet (UV).
Light with a wavelength < 400 nm.

Infrared (IR).
Light with a wavelength > 800 nm.

Absorption.
The absorption or "swallowing" of light by the object.

Reflection.
Counter radiation of light.

Additive colour mixing.
Addition of light with different wavelengths. Example: Red and green light in the same proportion result in yellow light ("TV" principle).

Spectral colours.
All colours, which can be perceived by the human eye in the wavelength range between 400 nm (blue) and 800 nm (red).

Primary colours.
Red, blue, yellow (see subtractive colour mixing).

Subtractive colour mixing.
All colours can be achieved by mixing the primary colours red, blue and yellow.

Secondary colours.
Colours that emerge from a mixture of primary colours: green, violet, orange.

Metamerism.
Apparent similarity of a colour under a light source, for example, daylight, while under a different light source, for example, street lighting, different colour impressions can emerge.

Transmittance.
Is a measurement unit to determine the amount of light that is transmitted.

Interference pigments.
Specific effect pigments, for example, pearl or Xirallic® pigments, the effect of which is created by the interference (overlapping) of different effect layers.

Colour flop
The colour flop is the point at which the light reflection is reversed at effect pigments. This results in colour changes or light/dark changes.

Effect pigments in the automotive industry.

Effect colours are those which also contain metallic or pearlescent pigments or other effect particles besides colour pigments. If a colour only contains colour pigments, this is called a solid colour.

In the field of car paint, diverse effect particles are used in order to create different effects. The refinisher must therefore adapt the colour according to the type and quantity of the effect particles used.

Many varieties are possible from an iridescent colour change via metallic glitter through to a fine pearlescent shimmer. For special refinishing (exclusivelineXL) and for the show car design for individual cars, even more is possible than in the automotive serial production.

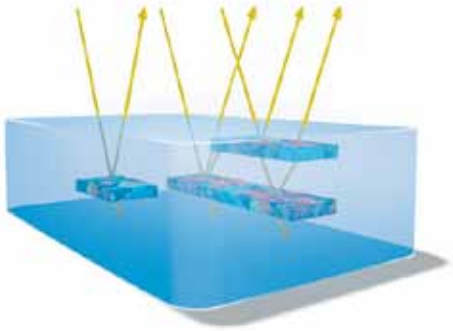
The number of effect particles is continuously growing and more and more possibilities arise in order to visually change and design a car through colour.

Matt finishes in different degrees of gloss are becoming increasingly popular in automotive serial coatings.

Colour is an important and comparatively economical resource for manufacturers to differentiate themselves and give the car a particular image.

Effect pigments.

Reflection aluminium pigments:
Light is reflected.

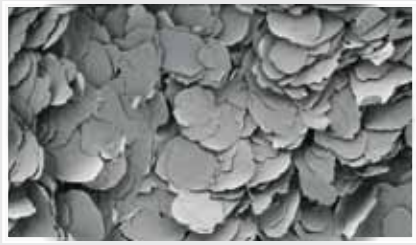


Reflection pearlescent pigments:
Light is refracted.

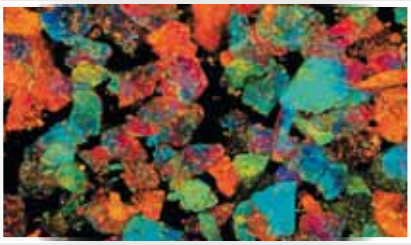
The basis of all colour effects is the interaction between light and material.

The effects are created through:
- Reflection
- Absorption
- Scatter
- Transmission

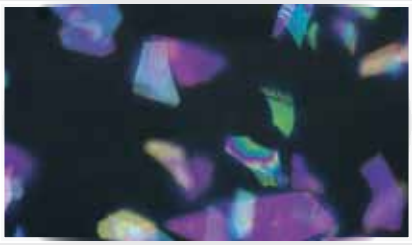
The most common effect pigments.



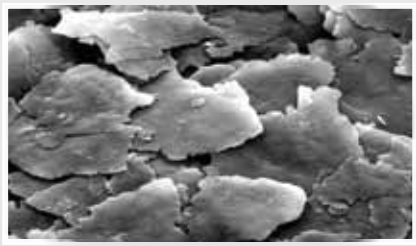
Silver dollar aluminium



Pearlescent pigments



Flip-flop pigments



Cornflake aluminium

Xirallic®

Example of flip-flop finishing "Blue Flame", Exclusive Line

Aluminium pigments.

Aluminium pigments are the most common effect particles used in the automotive industry.

They consist of small plates which give the paint its metallic character. They are usually silver grey and reflect and scatter the light. The reflection type depends on the size of the particles and the surface finish. Silver dollar aluminium has a lentoid shape and a smooth surface. It reflects the light in a vectored manner; colours therefore shine brighter.

Cornflake aluminium does not scatter the light as much because of its structured surface; therefore colours appear paler.

Pearlescent pigments.

Pearlescent pigments have been used since the 1980s. They use mica flakes as carriers, which are coated with different metal oxides. Thin flakes in different sizes provide the desired effect.

The effects of the pearlescent pigments are due to interference, transmission and absorption.

The flakes themselves are usually semi-transparent and refractive, creating fascinating colour changes. Colour and brightness depend upon the visual angle. In order to obtain an ideal refinishing result, the pigments must be aligned in parallel.

Special effects.

The so-called flip-flop pigments are characterised by a colour change or gradient. They also consist of coated flakes. These have many partially transparent layers, which glow in a spectrum of different colours depending on the visual angle and light refection.

The core of these flakes is non-transparent. These pigments consist of a very high colour brilliance and intensity.

Reasons for colour variations.

Colour variations occur in serial production despite modern test methods and processes.

Many reasons exist for colour variations in serial production.

- Different, worldwide production sites of the automotive manufacturers,
- Different application procedures, coating chemicals.

Different production sites.
Different models of a vehicle manufacturer are produced at different sites. With a wide colour palette, which is normally mandatory for all the vehicle manufacturer's vehicles, variations occur because of different production conditions at the various production sites. Among them are, for example, site-specific application procedures.

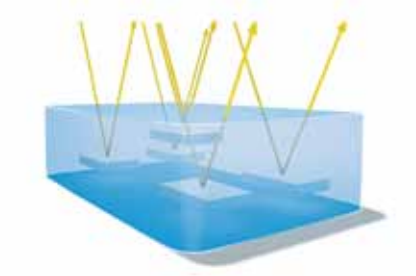
Application procedures.
Differences in the application result from deviating production conditions. Different results are achieved depending on how the paint is applied; manually, coating robot or electrostatically.

Coating chemicals.
Furthermore, the chemistry of the paints also influences the colour. Solventborne, water-based or powder paint is used depending on the manufacturing site. An effect also shows the index of refraction of the clearcoat used.

Therefore, a large number of relevant factors exist, which favour colour variations in serial production.

Manually finishing.

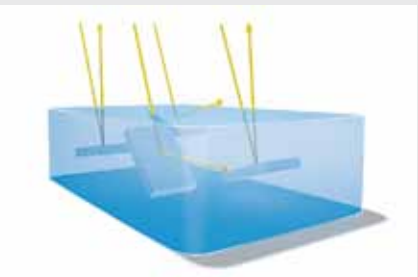
Electrostatic finishing (Esta).



Parallel orientation of effect pigments.

Electrostatic finishing with bell.

Rotary atomisers.



Random distribution of the effect pigments.

Metamerism.

Metamerism describes the optical phenomenon through which a colour changes under different light sources.

Sometimes a colour (e.g. serial finishing/ refinishing) seems identical in daylight, though it appears different under a different light source (e.g. street lights). Mesmerism is the result of different colour pigmentation, for example, if a green is based purely on a green colour pigment, while the same green has been mixed in a different composition with blue and yellow pigments.

Metamerism is avoided by exclusively using pigments for refinishing which have also been used in serial coating. The Standox colour formulae meet these requirements. The corresponding formulae are tested under different light sources in the laboratory before being released. If adjustment is needed in practice, it is therefore advisable to use only mixing colours from the given formulae.

TIP.
Solar-colour lamps or fluorescent tubes, e.g. Osram L58W/32-965 or Philips T1-D 58 W/965, work extremely well to control colours under artificial light.

Colour in daylight.

Colour difference under artificial light.

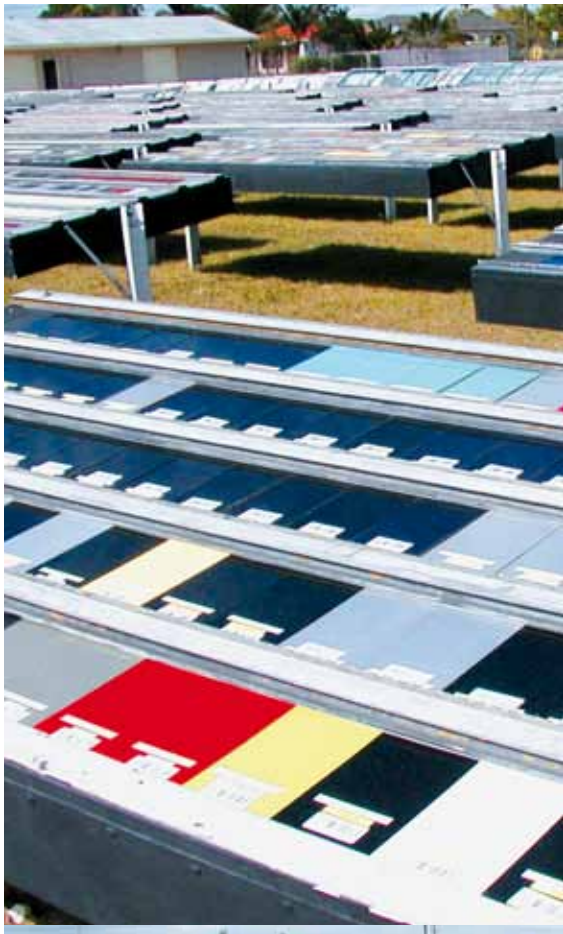
From the series colour to the Standox mixing formula.

Colour designers must fulfil numerous technical specifications and meet high standards when developing new colours for the automotive serial production.

New colour should, for example:

- Match the shape of the car, harmonise with it or highlight it
- Integrate with the manufacturer's colour range
- Meet specific pigment requirements
- Satisfy technical requirements (e.g. light resistance)
- Comply with calculation specifications
- Be suitable in serial production
- Be reparable
- Convey individual characteristics (image)
- Incorporate current fashion trends

Each new colour formula is also a challenge for the Standox experts. Despite an extensive formula archive, a specific formula must be created for each new colour in order to be able to reproduce each colour precisely.
Refinishing paints must also fulfil these criteria. This is why our products are always tested under practical conditions.



INFORMATION.
The stability and resistance of new colours is tested under "Florida weathering". The test can last up to three years.

Expertise in colour.

1 Standowin.

A colour share formula is easy to find with the help of a tried-and-tested software. The large database contains colours of all car brands, many colour registers and fleet colours.

Moreover, under “Colour info” you can find many pieces of useful additional information.

2 Genius & Genius iQ.

With the measurement devices Genius and Genius IQ you can measure colours and their nuances quickly and easily directly on the vehicle body.
Genius IQ even recognises the grain of the aluminium pigments.

3 Online colour search.

You can easily find updated colour information at any time on your local Standox website.
www.standox.com

4 Mobile app.

With the right app. for your Smartphone or tablet PC you can quickly obtain the latest formula in the paint-mixing area without being connected to the Internet.

Genius and Genius iQ.

Genius.

- Ergonomic design.
- Sturdy housing.
- Good haptics.
- Simple control button.
- Display, 128 x 64 dots
- Operation via thumbwheel.
- User-friendly menu navigation.
- Easy to calibrate.
- Reliable measurement due to 3 “contact pins“.
- High light output thanks to LED technology (16 LEDs).
- Internal memory for measurement data.
- Consideration of the grain addition of the effect navigator.

Genius iQ.

- Automatic measurement of the grain of aluminium pigments.
- Modern design.
- Stable housing.
- High quality haptics.
- Large and secure control button.
- TFT colour display with protective film.
- Operate using touch screen with stylus or thumbwheel.
- Easy to use supported by an intuitive graphic user interface.
- Pre-selection of car brands directly on the device.
- Internal memory for data, such as the car brand list and further information.
- Optimal positioning for reliable measurements on a flat surface through 4 “contact pins“.
- 100% protection against scattered light due to additional rubber ring at the measurement port.
- Additionally optimised LED technology (20 LEDs) for an even better light output.

See and experience the difference on:
www.standox.de/godigital

Finding the right colour quickly and effectively with Genius.

With Genius colours are reliably and effectively measured directly on the vehicle.

Electronic colour measurement with Genius is a must, if you want to determine colours in a quick, reliable and efficient manner in the future. In the future, automotive manufacturers could increasingly decide to eliminate colour coding completely. Determining colour would then become more difficult for independent paint workshops.

Genius helps to identify all relevant pieces of information on colours in a quick and simple way with a handy and reliable measurement device.

The colour is determined directly on a previously polished (only in the case of gloss varnish) even area as close to the damage as possible. Genius reliably identifies both solid and effect colours. The results of this 3-angle measurement device are extremely precise. The measurement data is transformed directly into a finished and, if necessary, corrected mixing formula with the software Standowin.

Genius especially demonstrates its strengths when dealing with difficult colours, such as serial-specific variations, and rare or varied colours.

Additional useful tips can be found on the following information posters:

Genius
- Seven tips for good measurement results
- Eight steps to optimum measurement results

Genius IQ
- Six steps for the optimum measurement result

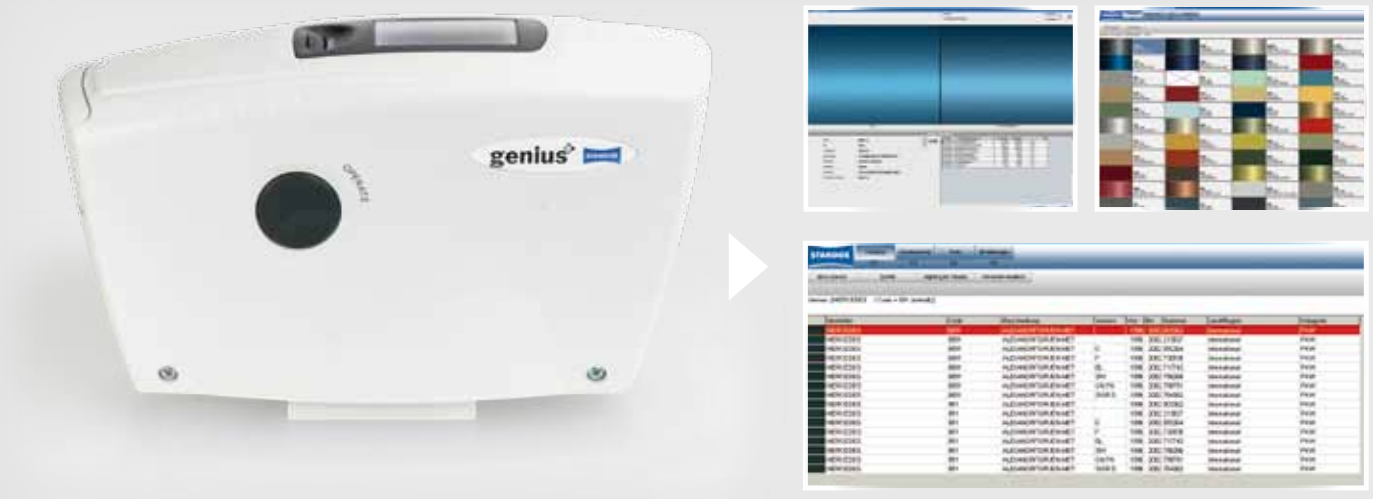
The way to the right mixing formula.

As is generally known, the same results can be achieved in many ways. Therefore, Standox offers numerous aids that offer effective support when searching for formulae.

Standowin.
Standowin offers several functions that facilitate day-to-day work. This software will enable you always to have access to all the latest colour formulae. You can search for a formula based on a previously determined coding or based on the Genius measurement results. When using Genius, Standowin analyses the measurement data and suggests the formulae from the database which best meet the measured colour. After the right formula is selected, the mixing formula is corrected automatically on the basis of the measured data.

The data obtained can be transferred directly to a connected electronic scale indicating the required quantity. Suggestions for the required material quantities can also be retrieved. Customer-specific formulae or identified nuances can be saved in order to have access to them at any time. In addition to the colour-formula search, Standowin offers additional brand-specific information under the category "Colour Information", for example, colour information of add-on parts or coding positions.

Formula search via the Internet.
Finding the right colour online: Go to your national Standox website. From there go to "Online colour search". Here you will find the daily-updated mixing formulae.




7:1
6:1


genius iQ

Colour matching with the blending technique.

Colour coding

Refinishing always starts with identifying the right colour.

Identifying the coding.
Finding the coding is usually like a "treasure hunt", since each automotive manufacturer mounts the type plates at a different place in the vehicle.
You can find useful information on possible locations under Colour Info in Standowin.

Polish the paint surface.
Clean and polish the paint surface next to the damage.

Visual comparison.
Colour variations are shown in the colour box. Compare the colour sample of the colour matching swatch close to the damage in order to identify the colour.
The proximity to the damage is extremely important, since the bodywork could have already been repainted in other areas.

Problems with the coding.
It could happen that
- colour codings are missing, incomplete or incorrect, or
- code numbers have been changed at the factory. This happens when contrasting colours for attachment parts or colours for the interior are also coded.

There are many options available to identify the right colour in these cases:
- Use additional pieces of information provided by Standowin in the category "Colour Information".
- The Standox Internet colour search offers information that is updated on a daily basis.
- Measure the colour with the colour measurement device "Genius".

If you still have not identified the right colour, you can call the coloristic experts on the Standox Colour hotline.

Preparing sample panels.
It is best to prepare two sample panels with the identified colour. Paint both panels as usual. For the second panel, add a half coat (finish coat) on the wet basecoat on the second panel. After drying, the clearcoat is applied. With the finish coat, the effect pigments are deposited on the surface and the colour appears lighter.

If possible, carry out the corresponding colour test during daylight (northern light) or with the aid of daylight lamps from several angles in order to correctly evaluate the changing and flop effect in the case of metallic or pearlescent colours.

TIP.
- Always correctly label and file colour samples immediately.
- Store the data in Standowin.
- In the case of special paint, it is recommended to prepare 3 colour sample panels.

Colour and effect matching with the blending technique.

Sometimes, the result is not as expected despite complex nuances and optimal workshop conditions.

Clearly visible areas at one level (e.g. wing, door, side panel) are typical “traps“, particularly when there are no beading, attachment parts or if there is only a narrow clearance between the new and the old paintwork.

The blending technique is a suitable technique that is also recognised by insurers. This enables the alignment of small colour differences between new and old paintwork.

A data sheet to improve solid and effect paintwork, published for the trade and insurance companies by BFL, ZKF and other relevant associations, describes the techniques and procedures.

Blending is described there in detail. The data sheet can be accessed under www.farbe.de and www.zkf.de.

Identifying repair costs/profitability.

Taking today and looking at future trends of the paint industry, it is important to take into account different factors while preparing a budget for the client in order to guarantee profitability and effectiveness for the refinisher and the customer.

The following factors should be taken into account in establishing the price and the refinishing cost:

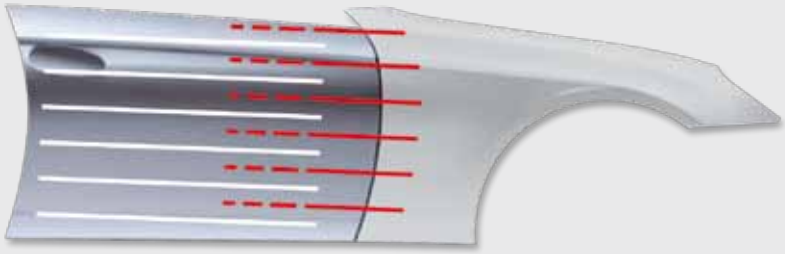
1. Does the paint need several coats such as a 3-coat structure?
2. Does the colour present any special features such as a tinted or matt clearcoat?
3. Is a special base colour/filler needed?
4. Has the vehicle been resprayed or received a special finish?

This check should be carried out as a matter of routine before the investment in time and the material has been calculated for the painting. This will enable any misunderstandings with the customers and unsuspected complications to be avoided during the work.

Blending within a vehicle part. (using the example of Standoblue).

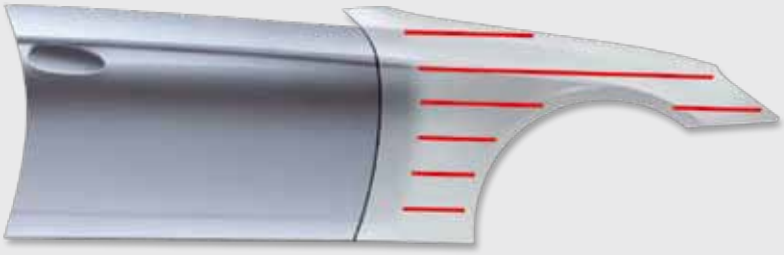
Step 1.
Apply Standoblue colour blend in thin closed coats on the surrounding surface of the area to be blended or on the adjacent body part.

Step 2.
Blend the first coating of Standoblue basecoat up to the edge of the Standoblue colour blend or in the adjacent area/the adjacent part. Apply the effect coating and blend it into the wet Standoblue colour blend.



Step 3.
Apply the Standoblue basecoat as normal with 1.5 coatings on the area to be repaired (filler).

(Pressure 1.5–2.0 bar.)



Step 4.
After ventilating a Standox Apply VOC clearcoat.

Professional refinishing paint with professional products.

Standox is one of the world's leading manufacturers for automotive refinishing paints and offers high-quality and eco-friendly product systems for modern painting operations.

The quality of a refinish depends on the right colour. For this purpose, we offer sound product systems for each application area, which guarantee a perfect refinish.

Our products do not only comply with the EU environmental regulations but must meet all required properties around the world. Moreover, whenever possible, we refrain from using harmful components, even if their use is permitted. Our products shine through their high user-friendliness and great efficiency. Standox ensures efficient products are always available with a broad range of customised products that is constantly being supplemented and improved.

The quality and standards of our products are reflected in the large number of approvals we obtain from automotive manufacturers. Our independent bodyshop customers also take advantage of this.

Numerous aids and practice-oriented training ensure that you are always up-to-date.

Training.

The continuously increasing complexity of colours and the higher quality of materials place tougher demands on the refinisher.

Standox therefore offers a specific coloristic seminar for refinishers, in addition to many other training courses. Everything you need to know about colour is taught in this target-oriented training course in theory and in practice.

Further information is available from your Standox technical advisor.

Outlook.

The automotive and paint industry is guided by international trends from a variety of sectors. Colour, design, shape and materials play an important role. It may be true that the trends are not as fast moving and volatile as in other industries, but they do last longer.

Again and again, automotive manufacturers try to catch attention with unusual colours and effects. The paint manufacturer and obviously the refinisher must be able to adapt react flexibly. This means that the right solutions have to be available for painting as well as for refinishing.

Different tendencies and trends, which will certainly endure over the coming years, have existed for some time now. Colours like white, orange and different shades of brown are now well-established. Altogether, an increasing trend to see more colour is predicted. The silver era is over. Nevertheless, the undisputed bestsellers black, white, silver and grey are no substitute for colour.

New technologies are also gaining more ground and are appearing more and more often in the street scene. Talk is about the so-called tricoats (3-coat structure with a transparent effect layer on top of the basecoat) or tinted clearcoat (colour, tinted clearcoat.) These trends are mainly coming from Asia and the USA, where they have already been well-established for many years.

The so-called liquid-metal shades, which make a car look like it is made of steel or chrome, are also in the limelight for designers at automotive manufacturers. Special series are already present in the market. A persistent trend is also the matt clearcoat, whether applied to attachment parts or the entire body. The velvet look of the surface induces us to touch the car and gives the colour a completely new appearance.

These more complex colours and technologies mean that: paint manufacturers and refinishers must be prepared and have solutions ready for when these trends start conquering the streets.

Standox accepts these challenges and offers practice-oriented solutions.

The right advice, the necessary aids and target-oriented training on a variety of topics guarantee the refinisher support.

Cars would not be half as attractive without the creative art of painting with all its colours and possibilities. As competent experts, refinishers master their craft and are aware of how to manage the interplay between colour and material in order to make our cars look new, individual, perfect or even exclusive. We, at Standox, support you with the best means, because the focus is, as always, on: the art of refinishing.

Variation description.

Brown	Yellow	Blue	Green	Grey	Red
BR	**GE**	**BL**	**GN**	**GR**	**R**
BR+	GE+	BL+	GN+	GR+	R+
BR-	GE-	BL-	GN-	GR-	R-
BR.D	**GE.H**	**BL.D**	**GN.D**	**GR.D**	**R.D**
BR.D+	GE.H+	BL.D+	GN.D+	GR.D+	R.D+
BR.D-	GE.H-	BL.D-	GN.D-	GR.D-	R.D-
BR.H	**GE.D**	**BL.H**	**GN.H**	**GR.H**	**R.H**
BR.H+	GE.D	BL.H+	GN.H+	GR.H+	R.H+
BR.H-	GE.D-	BL.H-	GN.H-	GR.H-	R.H-
BR.GB	**GE.GB**	**BL.GB**	**GN.GB**	**GR.GB**	**R.GB**
BR.GB+	GE.GB+	BL.GB+	GN.GB+	GR.GB+	R.GB+
BR.GB-	GE.GB-	BL.GB-	GN.GB-	GR.GB-	R.GB-
BR.FN	**GE.FN**	**BL.FN**	**GE.FN**	**GR.FN**	**R.FN.**
BR.FN+	GE.FN+	BL.FN+	GE.FN+	GR.FN+	R.FN.+
BR.FN-	GE.FN-	BL.FN-	GE.FN-	GR.FN+	R.FN.+

Dark	Pale	Light	Shining	Rough	Fine	Matt
D	**F**	**H**	**L**	**GB**	**FN**	**Matt**
D+	GE+	BL+	GN+	GR+	R+	
D-	GE-	BL-	GN-	GR-	R-	

Service formulae are marked by writing "S!" before the variation name.

For example:
S! R **S! BL.D**
S! GN **S! GE.FN**

TIP.
For additional information, please visit our website at: www.standox.de

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