

It can't get any whiter than this

Summit White Opel
Candy White VW
Alabaster White Daimler
Ibis White Audi
Casablanca White Opel

White is sought after. It's considered a classic among automotive coatings. Developing paints and tints that remain stable in processing involves more than just technology. To those working with white it's primarily a matter of sensitivity.

By Michael Thiem; photos by José Carlos Zarcero



He knows what he is doing: Mateo Dicha fine tunes a white car paint with expertise and sensitivity.

Nobody stops Mateo Dicha. No, not violet! The customer wants white. Nevada White for the gas cap of a Seat. For this purpose, the tint of the car paint has to be readjusted. But the man from the Wörwag colour laboratory in Dosrius, Catalonia, almost 40 kilometers (25 miles) north of Barcelona, continues unswerving in his objective.

Buoyed by 35 years of experience in colour development and production, Dicha adds a splash of violet to the white. And another. "There's no such thing as a white white. The tint is decisive," the 53-year-old reveals as he stirs and presents the results. At first glance white, and on closer inspection, Nevada White, which meets the technical requirements. Dicha trusts the measurements. They show: "Yellow is no help in this case. It has to be red-violet." Then he puts the cup aside. "There are a lot more complex colours than white."

White is all the rage, it's classic. All over the world. For decades, almost every third car in Europe has been white or white-metallic. The popularity of the white colour group will last, says Helmuth Dengel, Head of the Development Team for premium and single-colour coatings. Reason: "The colour is emotionally evocative, it's clean, pure, noble and robust."

No effect on the interior temperature

There are also practical aspects. White suits any model, from small cars to luxury sedans. Chipping from stone impact, scratches and other defects are less noticeable. Dengel adds: "Compared to the typical forms of the eighties, white looks better on the beading and edges of today's chassis contours." A white car is cleaned less often. People assume that the interior of a white car is cooler in the sun. Actually it's no cooler than a black car. According to a study by the Touring Club Switzerland (TCS), the paint colour has no effect on how warm it's in the interior. However, the body of a black car will really get hotter faster than a white car body.

Presumably that is why white is so popular in hot countries, including Spain. "Besides black and red, white is our most important colour," says Montse Lopez, who as a sales expert in Dosrius, knows exactly what customers want. Customers include Daimler, VW,

Seat, Nissan and their suppliers of plastic add-on parts. Minor requests for service or adjustment work are handled by the nine employees in Dosrius. When it comes to larger orders or modifications, the experts in Stuttgart are involved.

Colour impressions are subjective

What is important in the development of a white vehicle paint? "White is not just white," says Herbert Kost, Director of Design and Pigments. "Yellowish white looks old, and some find it ugly. If it has a blue tinge and radiates, then most people are won over." And what one person perceives as gray, still appears as white to another. There are no clear criteria of when white is still white. The subjective colour impression is decisive.

Customer demands have increased in recent years. Metallic paints and pearl effects have displaced solid colours, and multi-layer-

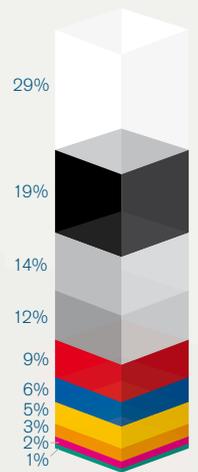
"The colour white is evocative, clean, pure, noble and robust."

Helmuth Dengel



On a white mission: Herbert Kost, Armin Lechner and Helmuth Dengel (from left).

THE
WORLD'S FAVORITE
CAR COLOUR
Almost one third of
all vehicles in 2014 were
painted white
or white-metallic.



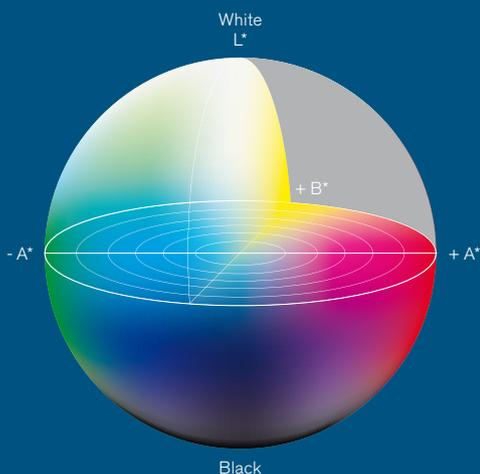
ONE DEVICE, A WORLD OF POSSIBILITIES

Wörwag pulls out all the stops to ensure and optimize quality. The experts in the process engineering, materials engineering and analysis departments have a surface scanner at their disposal. This high-tech testing device measures coated flat surfaces in all of the Wörwag departments. It combines various measuring instruments, like the "BYK-mac-i" (see box to the right). The device can be used in the early phases of colour development to assess colour-shade characteristics and stability in connection with the coating process. A complete battery of measurements includes layer thickness, flow, gloss, and cloudiness. Tests from a range of different coating systems can be compared side by side, for instance. Thanks to the surface scanner, colours can be brought to market faster. Developers can fine-tune various parameters to improve the quality of the surface. The device also helps to monitor customer requirements more precisely.



A BYK-MAC-I FOR ANALYSIS

The "BYK-mac-i" spectrophotometer is used regularly in the development and tinting of colours. It irradiates the surface to be measured with a series of bands of light that cover the entire spectrum, and measures the re-emission from each band. Solid colours are measured at an angle of 45-degrees. Four additional angles are required for special effect paints. Each measurement gives a point which can be situated in the so-called CIELab colour space. These are plotted on three axes: red-green, blue-yellow, and the vertical luminance or simply L-axis with the endpoints white and black. The developer can thus compare the co-ordinates measured with those specified to determine whether the hue is within the accepted tolerance.



THE CIELAB COLOUR SPACE

The International Commission on Illumination CIE (Commission Internationale de l'Eclairage) published the LAB colour model in 1976. Its predecessor dates back to the thirties. It is based on human perception and is independent of the production or reproduction technology used.

* Since 1976, these stars have indicated the CIELab colour model. It's designed to make a distinction between this model and its predecessor, the Lab colour space.

ered structures pose some tricky tasks for developers. After all, it's not just about the right colour, the process reliability in the series is also vital. Spot-repairs directly on cars and new application methods are other aspects that need to be taken into account during the early stages of development.

"The trick is to design the paint so that it can be processed at all."

Helmuth Dengel

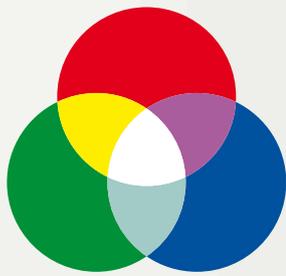
One real sticking point is opacity. Unlike other paints, white contains only one pigment, so the name of the game is: add titanium dioxide until you reach opacity. The white pigment portion can be as high as thirty percent. That is a much higher figure than for other paints. But Dengel knows that this means other problems: "If the pigment content is so high, the paint flows quite differently. The trick is to get it to the point where you can even process it at all." Among other things, one must know the proper technique for wetting of the pigment.

Antonio Valverde, who is responsible for colour design and development at Wörwag in Spain, knows that the smallest differences are already decisive. "Sometimes bodywork and plastic parts, which are painted in the same shade of colour, differ optically from each other," says Valverde. "Such disharmonious results are often rejected by the customer, even though we have actually strictly followed their criteria."

Research on behalf of customers

Developing white paints ready for series production is an equation with many unknowns. In a two-year research project on behalf of Daimler AG, Wörwag identified which shade of white can be used on both plastic and metal body parts to produce the maximum brightness with a single application. The answer is Moonstone white. "But if you go to the designer with that proposal, he will reject it because it's too dark," reports Armin →

- **Cortina white** Audi
- **Pure white** Daimler
- **Calcite** Daimler
- **Alpine White** BMW



COLOUR ADDITION
A phenomenon of
the human eye: red plus green
plus blue makes white.

→ Lechner of the development team for Uni- and Premium Colours. "The production department, however, is excited because they can process it and it's stable."

As a compromise, Daimler chose Diamond white for the series. Since the proportion of opaque pigment is extremely high here, special effects and colour pigments cannot be mixed in a single paint layer. They have to be layered successively. Another requirement, which set limits for developers, was a primerless coating process. A so-called compact or *integrated paint process*, (IPP) has long been standard in the automotive industry. However: "If I drop the primer, the body is missing an important sunscreen, which the white layer will now have to provide as well," says Lechner.

It does not always have to be white. For his own car and leisure gear, Dengel has opted for a contrast. The team leader regularly plays piano and bass guitar in a band. Both are painted matt black. Dengel: "Colour is emotion." And the trend for him on stage is definitely away from white. ■

Pure White VW
Polar White Daimler
Light White BMW Mini

INTERVIEW



“Cream is for
your second
wedding”

Philipp Tingler has been able to help many people. Especially brides. The philosopher and writer clears up some common missteps involving colour. White is definitely not one of his favorite colours. And it does not suit most brides anyway, he says. And mentions other reasons.

By Michael Thiem; illustration by Julia Worbs

Is white your favorite colour?

Certainly not. There are many situations when I think white is awful.

To be so vehement, you have to actually be quite fond of the colour, don't you?

I do confess, white is rather sophisticated. In fact, it's one of the most difficult colours, although people think the opposite is true.

Are there any white objects that you like?

Oh many. For example, I like white porcelain best, without decoration.

When don't you like white?

Colour theory says: light colours broaden. Therefore, one must be careful with white pants or even skirts, unless you are very slim. A man's wardrobe should only include white t-shirts, dress shirts and dinner jackets for cruises and outdoor occasions. And of course the proverbial white waistcoat to go with tails. Because of rule number one, in particular: no white belts. That is true for all genders and ages. Unless you're younger than ten.

What colour is your car?

In the registration documents it's "metallic blue". I didn't actually pick the colour, it came with the car: A Mercedes R107 from 1980. But the colour is a good fit for the car.

Where do you have white in your home?

On the walls, for example. Then the Kurland porcelain. The Saarinen chairs plus table are also white.

How do you explain to a bride that white is an unflattering colour for her dress.

White expands. Every bride should keep that in mind. Eggshell can already make a big difference. But avoid cream. That's for your second wedding.

“There are many situations when I think white is awful.

My favorite colour is medium beige.”

What goes through your head when a white car pulls up beside you at the traffic light?

“Not again!” Unless it's a Rolls-Royce Phantom. Then I think: “Hello, Kanye!”

Why is white so popular for cars?

White has the image of being classless. And according to conventional colour psychology it's also deemed to be discreet, sensitive and dutiful. Owners of white cars allegedly wash them more frequently and follow traffic laws. It doesn't seem very cool. But in that vein, many choose white for safety reasons. Bright colours are more visible. I read on the Internet, that if you want to go for the safest colour, buy a mint green car. Well, unfortunately, we no longer live in 1985. Or perhaps fortunately.

What colour suit goes with which vehicle? And why?

Here we could take the three most important rules of wardrobe wisdom and apply them to the road. So that would first mean: ladies and gentlemen over 35 need to be very careful with any shade of colour. This also applies to their choice of car. Brightly coloured cars suit young people. Secondly: forced concoctions that are intended to appear unconventional, are usually embarrassing, just like suits in dayglo colours. The automotive equivalent would be a pastel compact car. Or racing stripes on a French mini-van. Thirdly:

overweight people are well-advised to wear muted colours. This rule, known as the Helmut Kohl principle, can also be directly applied to the automotive world. Larger vehicles look best in darker colours: anthracite, hunting green, marine blue. Light gray would be an extreme option.

What is the role of white in art?

It's important. Besides gold and blue, white is one of the most prominent colours in art history. White symbolizes more than innocence. Ever since the rediscovery of the colourful splendor of ancient temples, which were, mind you, just as brightly painted as their sculptures, white has been associated with the Enlightenment values: Equality, justice and reason. So it's a very virtuous and rational colour.

And finally: What, then, is your favorite colour?

Medium beige.

PHILIPP TINGLER

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