

# technical bulletin



## Technical Bulletin | Hiding and Off-Whites

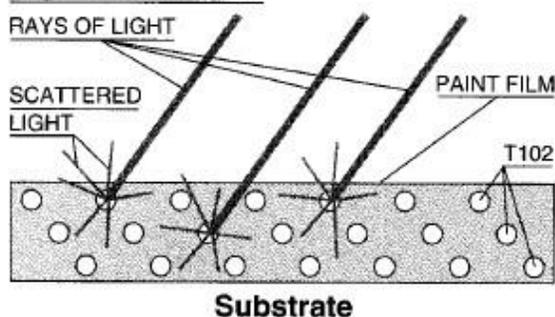
**Issue:** Extremely light off-whites, or clean whites as they are often classified, present a technical challenge for both the manufacturer and the painter. The reason is that they simply do not hide as well as darker or “dirtier” shades. Efforts to enhance the hiding of clean off-whites are limited by the very nature of the colors involved.

Why can't the hiding of clean off-whites be better?

To answer this question, an explanation of hiding is required. There are two optical phenomena that provide paint with its ability to cover or hide a surface. Hiding results when visible light strikes the coating's surface and is either; a.) scattered and reflected back out of the film (refraction), or b.) scattered and absorbed by the coating film itself (absorption.) In both instances, hiding is achieved because the incident light does not completely penetrate through the coating to the substrate and back out again.

Refraction (Fig. 1) is the tendency of a material to bend and scatter visible light waves. A material with a high refractive index is very effective at scattering light. Because titanium dioxide has a high index of refraction, it is the material of choice to provide hiding in paints. Increasing the amount of titanium dioxide in a paint will increase its hiding ability. Unfortunately, with many of the high quality coatings, the paint formulator reaches a point where adding extra titanium dioxide does little to increase hiding.

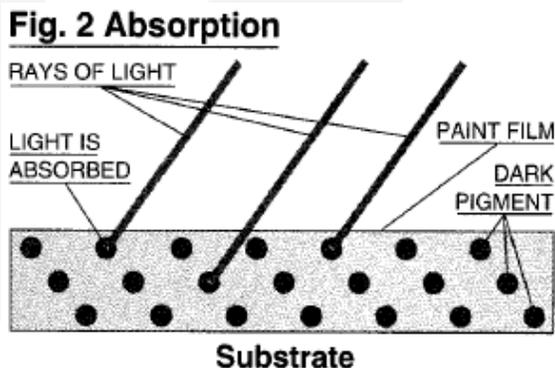
**Fig. 1 Refraction**



When a paint formulator reaches this point of diminishing returns, they can turn to absorption (Fig. 2). This is accomplished by adding dark colored pigments to the paint. The dark particles absorb the incoming light waves. Here again, light is prevented from reaching and exposing the substrate.

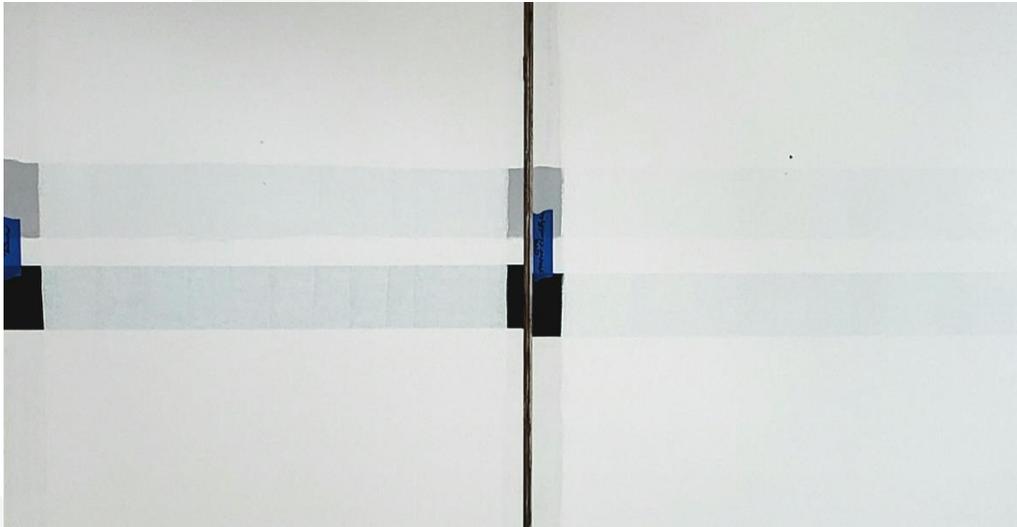
This explains why adding a little black or blue tint, called toning, to a white paint can improve its hiding. Adding small amounts of toning not only improves hiding but can also make the coating appear whiter by compensating for any slight undertones.

The addition of black would make it impossible to achieve the clean off-white color. Because they contain no light absorbing dark pigments, these clean off-whites have to rely almost entirely on refraction for their hiding ability. Their ability to hide is technologically limited.



So, how can we obtain a high hiding professional looking job with a clean off-white?  
Prepare the surface carefully.

Surface preparation can't be over-emphasized. The substrate must be uniform in both color and porosity. If an underlying wallpaper pattern is still visible or tape joints are pronounced, the surface is not ready for a clean white. Use a Benjamin Moore® primer, Fresh Start High-hiding All Purpose Primer (046-00), and tint it as close to the off-white color as possible. An example that has been tested for Fresh Start® High-hiding All Purpose primer 046 is to add one full ounce (1 X 0) of W1 Gennex® white colorant plus 25% of the finish coat tinting formula to one gallon of primer. One coat of tinted primer along with two finish coats will provide sufficient hide. Using a similarly tinted primer, such as N534, is an additional option for commercial products such as Ultra Spec® 500 0X base in Low Sheen and Eggshell.



1 coat - Fresh Start® 046-00

1 coat - Fresh Start® 046-00  
tinted to "Simply White"  
(1 X 0 W1, 0 X 1 S2, 0 X 0.5 Y3)

## Use the best tools possible

Quality brushes and roller covers offer the best method of achieving a uniform application at the proper spreading rate. This is the key to getting all the hiding that a product is capable of providing.

## Quality workmanship will be rewarded by a quality job.

A quality effort goes hand in hand (literally!) with quality tools. Follow product application instructions using the proper painting techniques. Applying two coats of the finish coat will provide enough film depth to deflect and scatter the incidental light. Equally important is to not over-apply the products in order to achieve greater hide. Using a wet film gauge can help you ensure the correct amount of material is being applied to the surface.

Simple advice like "don't spread the coating to far", "don't over thin the paint" and "don't rush through the job" can go a long way toward achieving a satisfactory finish.

The problems of poor hiding can easily be averted by following these recommendations. Understanding how these clean off-white colors hide, and what their capabilities are, will help you achieve the maximum performance of the product and reward you with a beautiful job.

## Ultra Spec® 500 OX base | N537 & N538 Colors

Color Number	Color Name	Color Number	Color Name	Color Number	Color Name	Color Number	Color Name
2017-60	pale daffodil	2148-70	mountain peak white	AF-15	steam	OC-126	easter lily
2018-70	milkyway	2149-70	white chocolate	AF-20	mascarpone	OC-127	white chocolate
2019-60	lemon sorbet	2150-70	easter lily	AF-40	lychee	OC-130	cloud white
2021-60	provence crème	2152-70	mayonnaise	DC-01	bancroft white	OC-17	white dove
2021-70	pale straw	2153-70	ivory tusk	DC-06	dogue gray	OC-54	white wisp
2022-70	crème brulee	2154-70	vanilla ice cream	DC-09	willard white	OC-65	chantilly lace
2121-70	chantilly lace	2155-60	cream yellow	DC-41	decatour white	OC-66	snow white
2122-70	snow white	2160-70	sugar cookie	DC-42	essex yellow	OC-68	distant gray
2124-70	distant gray	2162-70	october sky	OC-105	calming cream	OC-85	mayonnaise
2137-70	white wisp	2163-70	winter sky	OC-110	milkyway	OC-89	butter pecan
2143-70	simply white	2165-70	butter pecan	OC-117	simply white	OC-90	vanilla ice cream
2144-70	snowfall white	912	linen white	OC-118	snowfall white	OC-91	ivory tusk
2145-70	cotton balls	918	white rock	OC-121	mountain peak white	OC-93	sugar cookie
2147-70	alpine white	967	cloud white	OC-122	cotton balls	PM-19	white dove
				OC-124	alpine white	PM-28	linen white