Solar Reflective Colorants

Keep it Cool

Chromaflo Technologies has a selected range of colorants available based on pigments with excellent properties to reflect sunlight. Reflectivity is achieved by the physical back-scattering of solar radiation by pigment particles. Everyone is aware that lighter colors reflect more light than darker colors. However, when a darker color requires solar reflection properties, special pigments can be utilized to achieve high reflection in the near infrared (NIR) spectrum.

Application

Chromaflo's solar reflective colorants enable paint manufacturers to create colors that stay cool outdoors, unlike formulations made with conventional pigments. This creates more flexibility in color choice for outdoor applications such as façade systems and industrial shipping containers.

Properties

The aim of solar-reflective coatings is to maximize the solar reflectivity of the coated surface. Solar radiation is more than only visible light. Ultraviolet (UV) and near-infrared (NIR) "light" contribute to over 50% of solar energy, see Figure 1. The more solar energy reflected, the lower the heat build-up of a coated surface. This reflection ability can be expressed as the Total Solar Reflectance (TSR) value (100% = total reflection: 0% = total absorption). Therefore, pigments with high TSR values show a high reflection combined with low heat build-up, and vice versa. All our solar reflective colorants contain either PBk 32 or PBr 29. PBr 29 is predominantly used in facade applications and PBk 32 is used in all others. The difference between the two pigments, besides color, is efficiency in the NIR region (see figures 2 and 3).

TSR Matching with Innovatint

Chromaflo's Innovatint software TSR module has the capability to calculate the TSR value of colors during color matching. Furthermore, TSR limits can be predetermined before matching, allowing for full control over TSR values throughout the matching process. When colorants and bases have been characterized using this module, existing formulations can be recalculated to show TSR values as well.

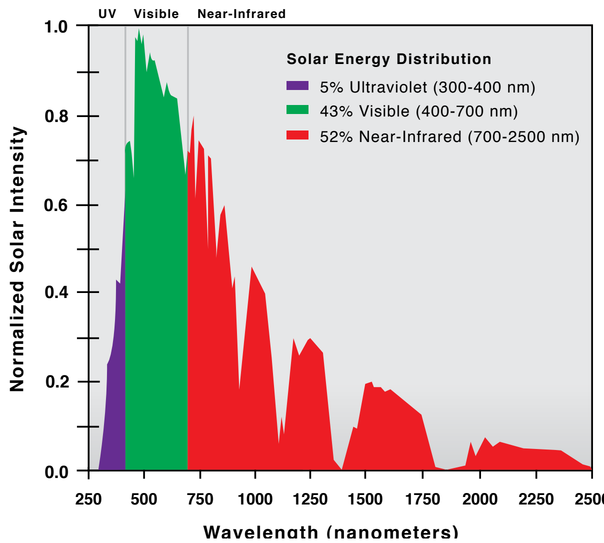


Figure 1: Typical solar radiation spectrum.
Light colors reflect more energy compared to dark colors, however the pigment choice can also have a great influence on the reflection properties. Figure 2 and 3 on the back of this sheet, illustrate the reflection curves of different pigmented topcoats and the corresponding heat build-up profiles.

Name	Application	Pigment	Pigment content of colorant [%]	Light Fastness of Pigment [1]		Weather Resistance of Pigment [2]		Density of Colorant (kg/m3))
				Mass	Tint	Mass	Tint	
Novapint D 803	In-Plant Facade	PBr 29	70	8	8	5	4-5	2452
Novapint E IR10	POS Facade	PBr 29	48	8	8	5	5	2003
Monicolor C IR	POS Interior	PBk 32	29	8	8	4	3	1137
Temacolor S TIR	General Industrial	PBk 32	20	8	8	4	3	1070
Plasticolors CF-02894R	Polyester	PBr 29	70	8	8	5	5	2381
Plasticolors CF-02895R	Polyester	PBk 32	20	8	8	4	3	1075
Plasticolors DTP-02918R	Plasticizer	PBr 29	70	8	8	5	5	2300

The values given in the table are guidance figures only. The data is obtained from pigment suppliers, individual testing is recommended.
[1] Light fastness is measured on an eight step blue scale, where 1 = very poor light fastness, 8 = excellent light fastness.
[2] Weather resistance is measured on a five step gray scale, where 1 = very poor weather resistance , 5 = excellent weather resistance.

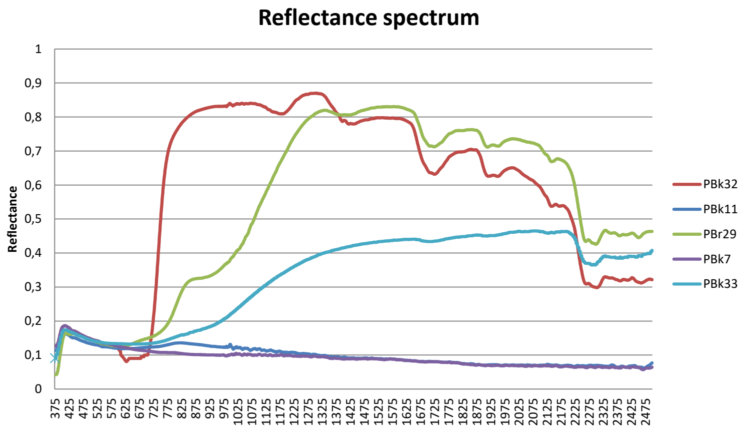
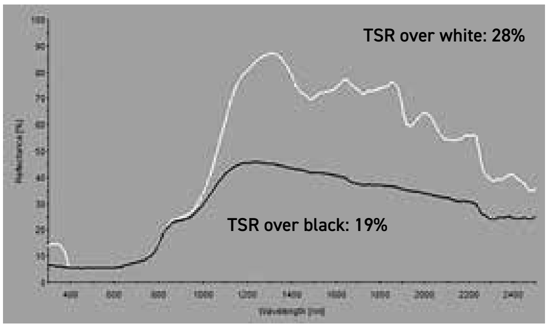
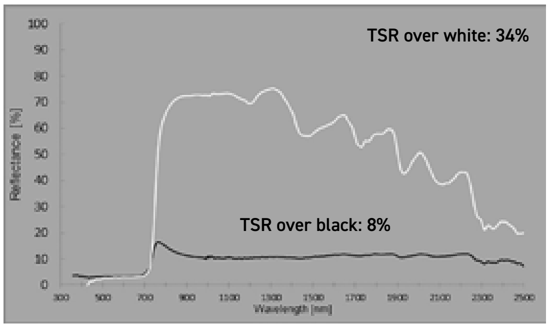


Figure 2: Reflection of black pigments



PBr 29



PBk 32

Figure 3: The role of surface color in TSR results
Comparison of TSR values of PBr 29 and PBk 32 over white and black surfaces

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