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E-mail: lifestyleds@yahoo.com, 64-65 Kazi Nazrul Islam Avenue, Dhaka-1215

BERGER WeatherCoat ANTIDIRT LONGLIFE

Generally Paints and Coatings can be described as fluid material that will spread over a solid substrate, dry and harden with balance adhesion and cohesion properties and it creates opaque/clear film which gives protection and aesthetic view. WeatherCoat AntiDirt LongLife (WC ADLL) is completely distinguishable from all kinds of exterior paint. In our country, huge quantity of dust is continuously generating from various construction works, smoke from different vehicles, and gases from different sources. Surface protection with aesthetic view is mandatory requirement for sustainable and damage free building.

WC ADLL formulation has been designed considering overall weather condition as well as sustainability of the building. Key features of the product have been discussed below:

- Based on Nano Technology
- Combination of high Tg polymer considering our weather and environment
- UV Resistance Technology and additional film brightness
- Reduce micro pore of paint film
- Prevents color fading & gives fresh painted look for long time
- Outstanding durability with special fungicide and algaecide

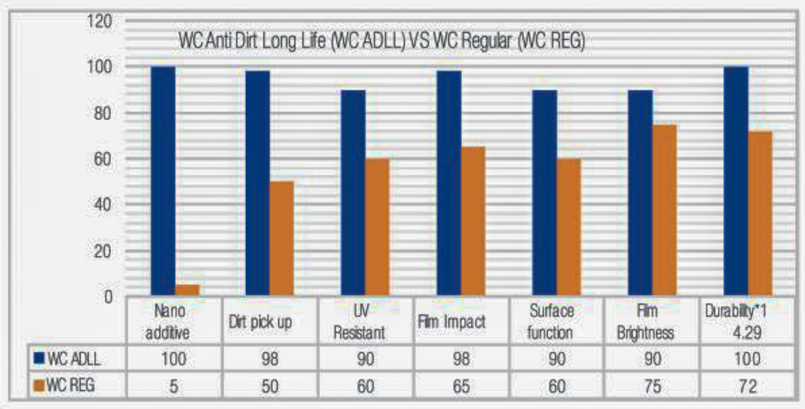
Nano properties: Nano comes from the Greek word "nanos", meaning "dwarf". Nano is a prefix meaning "extremely small". When quantifiable, it translates to one-billionth, as in the nanometer. Generally it refers to the size of particle (1 nm = 10-9 m). Nano-science and nano technology involve the ability to see and control individual atoms and molecules. Nano additives refer same things where particle size is very small and its spreading rate is much more wider compared to conventional additives. Nano material-containing coatings offer much better material and processing properties than general coatings and it increases indentation resistance, high elasticity, relatively fast drying, no expansion in contact with water, high water vapor permeability etc.

Figure 01: Comparison of two paint film

High Tg polymer combination: Tg (Glass transition temperature) is defined as the temperature at which the mechanical properties of a polymer radically changed due to the internal movement of the polymer chains. This nano particle based polymer (partial) was developed considering our humidity, temperature, dust and overall environmental factors. During formation of paint film after application in any exterior substrate, this integrated polymer create a compact network with nano additive like spider-web and then reshuffled with rest of the ingredients including Titanium Dioxide (TiO_2) and color pigments.

$$TiO_2 + h\gamma \longrightarrow TiO_2(e^- + h^+)$$
$$H_2O + TiO_2(h^+) \longrightarrow TiO_2 + {}^*OH + H +$$
$$O_2 + TiO_2(e^-) \longrightarrow TiO_2 + {}^*O^{2-}$$

UV Resistance Technology and additional film brightness: This paint film resist UV because of dry paint film impact, reinforcement and less pores due to the presence of nano particle. Paint brightness is relatively more as nano particle influence photo-catalytic reaction due to extensive surface energy. This paint consist of aqueous acrylic dispersion, various nanoparticles of nano additives and pigments (especially TiO_2). Therefore, anti-microbial ability and photo-activity was assumed in paint. The photocatalytic behaviour in paints is studied under UV light. TiO_2 is a photo-catalyst when it is illuminated by the light of energy. Electrons in TiO_2 will jump from valence band to conduction band and electrons and holes will form on the surface of the photo-catalyst. The negative electrons and oxygen will combine to form radical ions whereas positive electric holes and water will generate hydroxyl radicals "OH"- since both products use unstable chemical entities when the organic compound falls on surface of photo-catalyst it will combine with O_2- and OH- and turns to form CO_2 and H_2O.



	Nano additive	Dirt pick up	UV Resistant	Film Impact	Surface function	Film Brightness	Durability*1 4.29
WC ADLL	100	98	90	98	90	90	100
WC REG	5	50	60	65	60	75	72

Figure 02: Benchmark study

A tremendous amount of financial loss is incurred every year as a result of premature failures of paints and coatings. Coating failures can occur for dozens of reasons, although they are typically a result of poor application, defective coating, or inadequate specification. "Fading" is defined as the loss of color of one or more color pigments within the paint film. Premature and/or excessive lightening of the paint color often occurs on surfaces with consistently high exposure to sunlight. Fading or poor color retention can also be a result of the "chalking" process of the coating. Therefore, right pigments selection is an important task during formulation to get desired film look. Partial activation energy of the coated film due to the presence of nano-particles increase ultimate film brightness. Benchmark study between regular exterior-coating versus nano-additive based exterior coating is mentioned below at a glance for our understanding:

Durability of the coating: It depends on quality of raw material (RM) and formulation of paint but overall durability depends on prevailing climate effects and on a complex of physical and mechanical values of the materials used. Physical and mechanical properties of constructions substrate and finishing layer can supplement one another. To get desired durability RM(s) has been selected through proper evaluation at our Research and Development department and this paint also thoroughly tested in our environment for long time. Therefore, this is our proven product in terms of durability.

Dr. ASM Obaidullah Mahmud
Ph. D Chemistry & MBA MKT
GM – Research and Development
Berger Paints (BD) Limited