

Production of Stoving paints and their testing

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Abstract

Stoving paint is used in refrigerators, fans, scooters etc. This paint doesn't break because of high temperature. The stoving paint is prepared by the ball mill. After manufacturing, this paint is tested for flexibility and adhesion, hardness, resistance of acid and alkali, consistency and its volatile matter.

Introduction

The paint which are baked at 120 °C – 140 °C are called as stoving agents. These paints doesn't get hard on oxidation. It is used in refrigerators, fans, scooters etc. Marshall *et al.* (1988) revealed that a range of commercial stoving alkyd paints based on urea formaldehyde and melamine formaldehyde have been investigated using solid state N.M.R. technique.

Beck and Kruger (1996) say that cathodic deposition of paint is industrially exploited for the application of the polymer primer to metal mass ware surface. EIS was systematically employed for the first time for the characterization of the wet paint film prior to stoving on Al and Fe. Surface treatments as Zinc Phosphotation are also of some influence on the EIS results.

Benzer (2004) studied a raw material grinding circuit was modeled using plant data. Samples were collected from around the circuit and following a crash stop, from inside the mill. The size distributions of the samples were determined down to few microns. Using the data from inside the mill a modeling approach, based on perfect mixing, was developed. Chibwanand and Moys (2006) study the poor mixing in dry ball mills which can lead to insufficient presentation of find particle to the classifying air, over grinding of particles and wastage of energy in a ball mill. A video capture method has been used to study radial mixing kinetics in a dry bath ball mill. Experiments were conducted in a ball mill with PVC plastic powders being used as particles so that the effect of size reduction could be neglected.

Lameck *et al.* (2006), investigated the effects of three media shapes (cylpebs, spherical and worn ball) on load behaviour and mill power draw at various mill speeds and load filling. An inductive proximity probe was used to determine the load orientation of the grinding media charge while a load beam enabled measurement of power draw.

Materials and Method

Generally many ingredients are used in the preparation of stoving agents. These ingredients and their percentage are given in Table – I.

Generally Ball Mill is used for the preparation of stoving paint. It is a old technology and it takes 24 hours in grinding. It consist of a cylindrical drum lying on its side and provided with means by which it may be rotated. The drum rotates the balls are carried up the one side, rolling in relation to each other and then cascading downwards. Grinding is achieved partially by fraction between the balls and the walls of the drum, and partly by using crusting action which occurs during cascading.

Table – I. Ingredients their functions and percentage –

Ingredients	Functions	Percentage
Titanium Dioxide [TiO ₂]	Pigment	18%
Zinc Ocatate	Dispersing agent	0.5%
Nill set	Antecetalic	0.1%
Coconut oil alkide	Binder	8%
Xylene	Thinner	4%
Coconut oil alkide	Binder	10%
Xylene	Thinner	5%
Coconut oil alkide	Binder	32%

The factors which affects the efficiency of a ball mill is of greatest importance and are as follows-

- The rate of rotation.
- The size, quantity and nature of the balls.
- The amount and consistency of the material to the milled.

The balls may be made of a variety of materials the most usual being flint, porcelain, aluminium oxide or steel. The flint balls are not, strictly speaking, balls, but are natural most or less spherical pebbles which are collected from various, coats and sorted into suitable size ranges. The various types of balls are: -

Porcelain	2-3	flint, French	0.3-0.5
Granite	0.5-1	flint, Danish	0.2-0.3
Steel, High Carbon	0.3-0.7 steels	Chrome- manganese	0.1-0.3

The size of the balls may vary within wide limits, depending on their density, the size of the mill and so on. After preparing the stoving paint, we used this paint for their testing to that the prepare paint is good or not. For this purpose following parameters are analysed these are – consistency, flexibility & adhesion, Hardness, Resistance of alkali, Volatile matter.

Results and Discussion

In the present parameters consistency is measured by flow cup method, the paint are free flowing and take 80 seconds,(Table-2).

In flexibility & adhesion the painted panel is bent through 180° after specified drying period with the paint film outside in an apparatus and examined for any damage, detachment or cracking of the film, otherwise damage was not found after 48 hrs. The fill for protection was made from Al and Fe by Beck and Kruger (1996). Hardness is resistance to scratching under a specified load, of a dried film of the paint. The sample is passing the load of 2 Kg. which is according to the standard value.

In the resistance of acid or alkali, the colour is not vary more than slightly from that of untested portion of the test panel.

The volatile matter was found (51.40%) which was suitable match with the standard ($50.0\% \pm 2$), as also observed by Marshall *et al.* (1988). It is concluded that the sample is suitable matched with the standard.

Conclusion

The stoving paint after manufacturing has been tested, conducting various parameters. In which consistency is free flowing, flexibility & Adhesion is dry after 48 hrs. Hardness is passing the load of 2 kg., Resistance of acid and alkali has shown not more colour change from that of untested portion of the test panel and the volatile matter conduct 51.40% which are all according to the standard result, so we can conclude that paint is good and it impact the different environmental condition according to the values.

Table – 2 Showing Results in Various Parameters:-

S.No.	Parameters	Findings
1.	Consistency	free flowing after 80 Seconds
2.	Flexibility & Adhesion	Dry after 48hrs.
3.	Hardness	No cracking after passing 2 kg load
4.	Resistance of acid & alkali	colour will not very more than Slightly from the untested portion.
5.	Volatile matter	51.4%

References

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