

# New Color Matching System for Color Reproduction

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**Abstract;** The color matching of the paints are difficult for the three items of the issues, i.e., the variation of surroundings, the form of vane, and the rotative velocities of the vane. A new color matching system improved to the three items of the issues has constructed by the present study.

**Keywords;** Color matching system, Color reproduction, Paint, Stiring units, Diffusing circle

## 1. Introduction

The color matching is to stir the pigments of the three primaries in the paints, i.e., red, green and blue colors. The paints are containing to the pigments of the three primaries based on the peculiar combination ratio. The pigments of the three primaries have to be the uniform dispersion in the solvent<sup>1), 2)</sup>. The color matching used to the pigments of the three primaries, i.e., red, green and blue colors has not made by the chemical reaction of the pigments but the dispersion of the pigments<sup>3)</sup>.

By the mix of the paints using the conventional color matching system, it difficult to the uniform dispersion of the pigments of the three primaries in the solvent<sup>1)</sup>. The reason can be explained as follows.

- (1) The dispersion of the pigments of the three primaries in the solvent will be influenced by the chemical and physical characteristics, i.e., viscosity, adsorption, grain size and component.
- (2) The color matching will be influenced by the variation of surroundings, i.e., temperature and humidity.

Both the uniform dispersion of the pigments for the three primaries, i.e., red, green and blue colors, and the color reproduction can not be perfect carried out by any specialist.

In the present study, the above-mentioned issues in the conventional color matching system has improved.

Then the new color matching system has constructed. Using to the new color matching system, both the uniform dispersion of the pigments for the three primaries, i.e., red, green and blue colors, and the color reproduction have perfect carried out without any specialist's intervention.

## 2. Issue of the Conventional Color Matching System, and It's Improvable Method

### 2.1 Issue of the Conventional Color Matching System

The ideal color matching of the paints used to the three primaries, i.e., red, green and blue colors has need to execute the two items of issues as follows.

- (1) The certain quantity of the paints containing the pigments of the three primaries, i.e., red, green and blue colors is put in a cylindrical color matching system.
- (2) The rotating vane set into a cylindrical color matching system has mixed to the paints containing the pigments of the three primaries, i.e., red, green and blue color. And the paints containing the pigments of the three primaries can be uniform dispersed in the solvent by the shear stress of a rotating vane.

The ideal color matching used to the conventional color matching system is the impossible for the three items of issues as follows.

- (1) The solvent has vaporized by the variation of surroundings, i.e., temperature and humidity. Because the cooler is not equipped in the conventional color matching system.
- (2) The vane set into the cylindrical color matching system has influenced by the variation of the pigments, i.e., viscosity, adsorption, grain size and component. Because the vane set into the cylindrical color matching system is the rotation of the uniform velocity.
- (3) The uniform dispersion of the paints containing the pigments of the three primaries in the solvent has influenced by the variation of the shear stress of the vane set into the cylindrical color matching system.

### 2.2 Improvable Method of the Conventional Color Matching System

The conventional color matching system has need to improve the two items of issues as follows.

- (1) The structure of the cylindrical color matching system has to consider the variation of surroundings, i.e., temperature and humidity.
- (2) Both the form and the rotative velocity of the vane set into the cylindrical color matching system have to consider the variation of the paints containing the pigments of the three primaries, i.e., red, green and blue colors.

### 3. New Color Matching System

The points at issue of the three items used to the conventional color matching system has circumstantially investigated to the improvement of the proposed two items. The improvable items are as follows.

- (1) Variation of the temperature and humidity in the surroundings;

The compressed air has made the dehydration and cooling by the refrigeratory air dryer, and the clean freeze-drying air has prepared. The compressed air has ventilated into both the side and the bottom of the cylindrical tank in the new color matching system. The heat insulating material, i.e., hemp felt has put between the compressed air pipes and the outside of the new color matching system. Both the preparation and the ventilation of the compressed air are shown in Fig. 1.

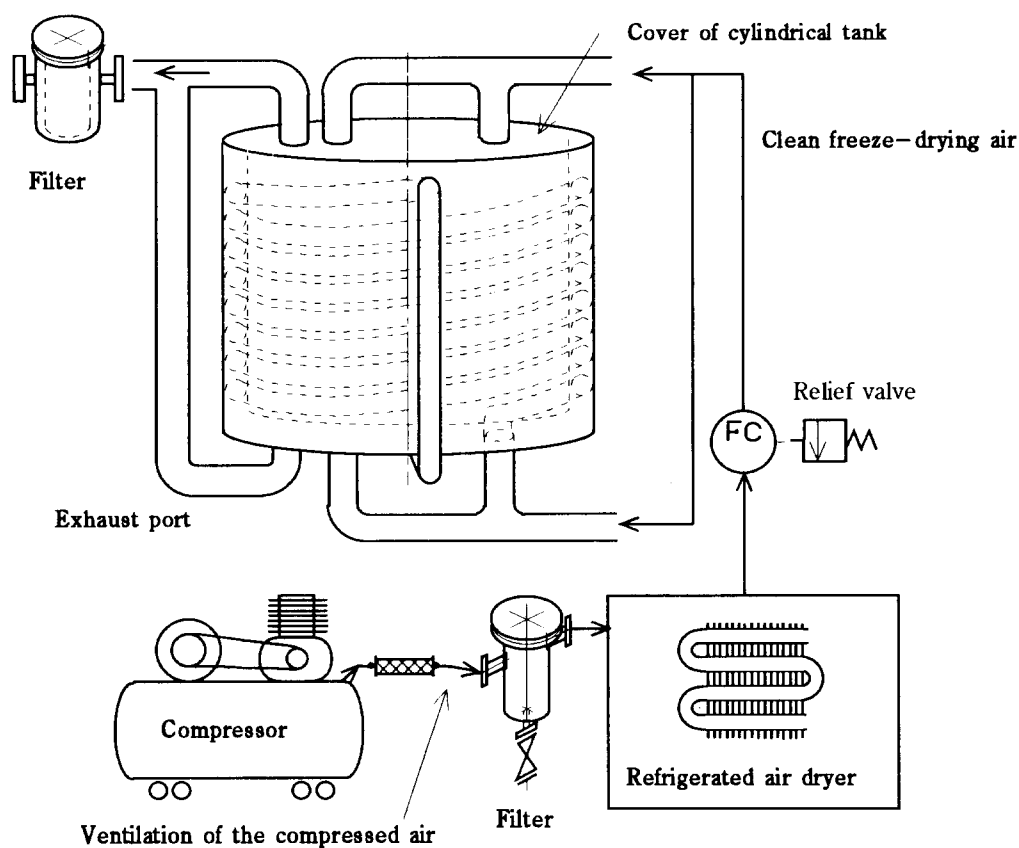


Fig. 1 Ventilation of the clean freeze-drying air in a new color matching system.

A new color matching system is not influenced from both the temperature and moisture. If the new color matching system was used, both the vaporization of solvent and the oxidation of pigments caused by the increase of temperature would be prevented. The temperature in the new color matching system has kept the 5 degrees lower than the temperature of surroundings, and the moisture in the new system has

sufficiently dehumidified.

The refrigeratory air dryer is a rapid freeze-drying equipment, and the moisture in the clean freeze-drying air is eliminated by the sublimation. The pressure in the new color matching system can be kept to the constant pressure by using the ball and spring. The mechanism for the constant pressure's

keeping in the new color matching system is shown in Fig. 2.

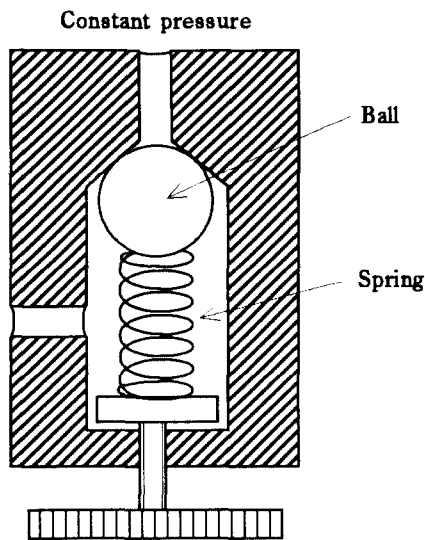


Fig. 2 Adjustment of pressure by the ventilation.

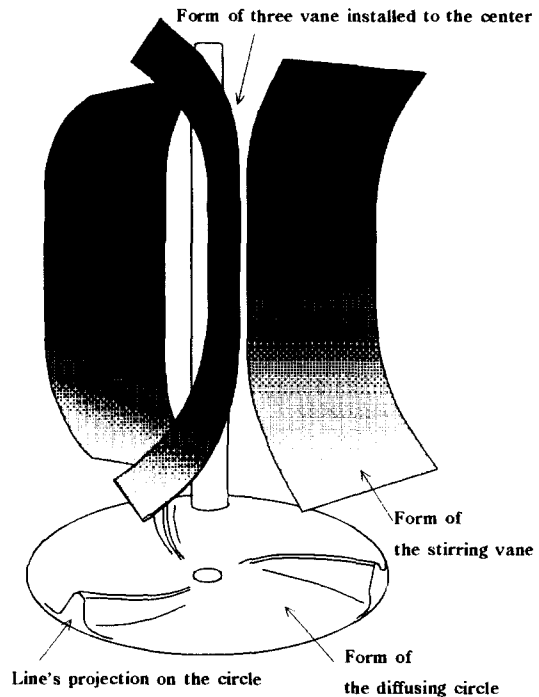


Fig. 3 Construction of the stirring unit in a new color matching system.

(2) Form of the vane and circle;

The dispersion of the pigment's components in the solvent are influenced by the chemical and physical characteristics, i.e., viscosity, adsorption, grain size and component. Both the stirring vane and the diffusing circle have circumstantially investigated with the form for the uniform dispersion of the paints containing the pigments of the three primaries, i.e., red, green and blue colors. The form of three vane installed to the center and the lines' projections on the circle installed to the bottom in the new cylindrical color matching system are shown in Fig. 3. The part shown in Fig. 3 has constructed to the stirring unit in a new color matching system.

By the rotation of three vane installed to the center in the new cylindrical color matching system, the paints containing the pigments of the three primaries, i.e., red, green and blue colors have vortically sucked to the center of the bottom in cylindrical tank. The sucked paints of the three primaries have diffused by the rotation the lines' projections on the circle installed to the center of the bottom in cylindrical tank from the bottom to the upper part in cylindrical tank. Both the uniform dispersion of the paints containing the pigments of the three primaries, i.e., red, green and blue colors, and the color reproduction have completed by the repetition of the stir and the diffusion for the color matching as the above.

(3) Rotative velocities on both the stirring vane and the diffusing circle;

The rotative velocities of the motors on both the stirring vane and the diffusing circle installed to the new color matching system are controlled by using the inverter circuit. Both the invariable torque and variable rotation of the motor has obtained from the inverter circuit. The variable rotative velocities of motor used to the inverter circuit can be match the variation of the chemical and physical characteristics, i.e., viscosity, adsorption, grain size and component.

A new color matching system has constructed from the above investigated results. The construction of the new color matching system is shown in Fig. 4.

#### 4. Conclusion

A new color matching system has constructed by the present study. The functions in the new color matching system are as follows.

- (1) The issue of the color reproduction upon the variation of surroundings, i.e., temperature and humidity has settled by the present study.

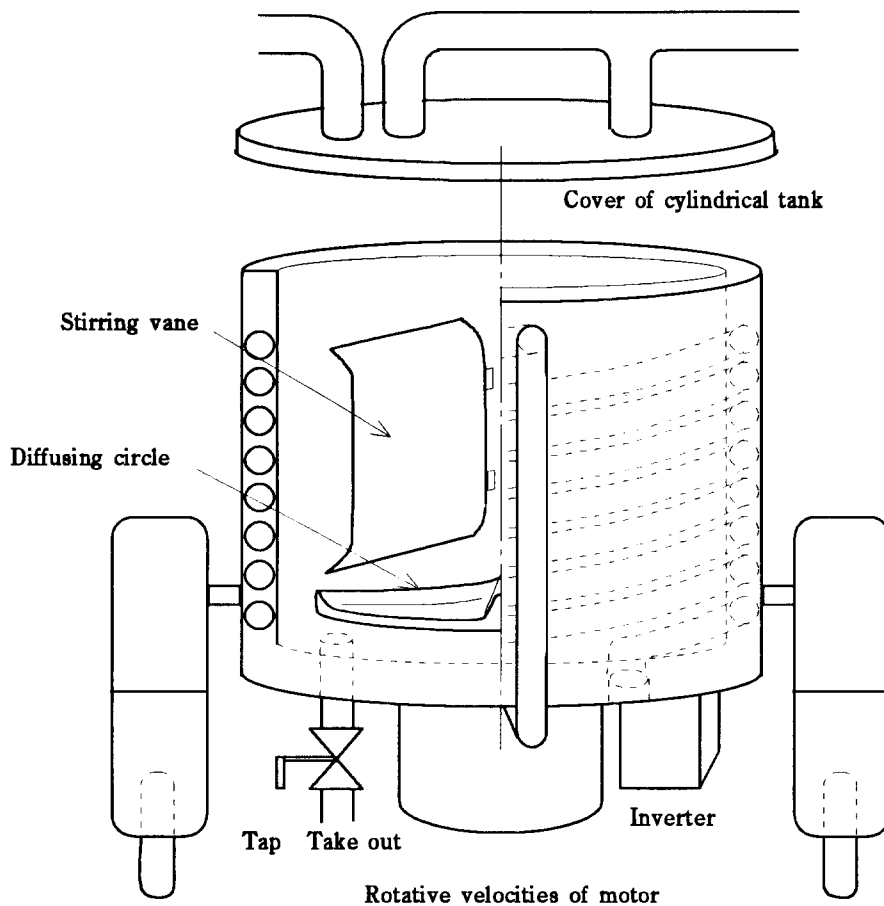


Fig. 4 Construction of a new color matching system.

(2) Both the uniform dispersion of the paints containing the pigments of the three primaries, i.e., red, green and blue colors, and the color reproduction have improved by the investigations of two items, i.e., the form of the vane and the circle, and the control of motor by the inverter circuit.

The conventional color matching system has influenced from both the variation of surroundings, i.e., temperature and humidity, and the chemical and physical characteristics of the paints containing the pigments of the three primaries, i.e., red, green and blue colors. Consequently, it is difficult to the uniform dispersion of the paints containing the pigments of the three primaries, i.e., red, green and blue colors.

The above-mentioned issues of conventional color matching system has improved by the present study. Then the new color matching system has constructed. The color matching of the paints can be improved without

any specialist's intervention.

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