LIQUID DEFLOCCULANTS

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1. INTRODUCTION

Mixtures of sodium tripolyphosphate and metasilicate in a solid state have traditionally been the most widely used materials for deflocculating suspensions of ceramic bodies in Spain. In recent years, this trend has changed slightly with the introduction onto the ceramic market of liquid organic compounds (mainly acrylic acid polymers), which on being mixed in with the traditional compounds usually reduce process costs.

However, the use of solid compounds for deflocculation could change radically in coming years, owing to the health risk involved in handling these products and to the growing implementation in the industrial process of continuous mills.

Two factors need to be kept in mind when it comes to assessing the effectiveness of a deflocculant: product cost/kg spray-dried powder and apparent viscosity of the slip. Logically, the lower the values of both parameters, the more effective is the product.

In this study, the effectiveness of a new type of deflocculant in a liquid state was tested. These deflocculants are already widely used in the Italian ceramic sector, but are relatively unknown in the Spanish ceramic branch. The products are formulated from a series of organic and inorganic compounds and can by themselves replace the traditional mixtures of metasilicate and tripolyphosphate, or the combination of both with organic compounds.

2. MATERIALS

Three different types of widely used compositions for ceramic tile manufacture were selected. The following compositions were involved: a) white stoneware floor tile, b) porous redware wall tile and c) porcelain tile.

Three different liquid deflocculants were also formulated, one for each studied ceramic composition. The components used to prepare the mixtures and their proportions were established according to the characteristics of each composition.

3. RESULTS

Figures 1-3 present the results obtained. With a view to analysing them better, the curves corresponding to the mixtures used at present have also been included.

On analysing the data, the following points may be highlighted:

- In each case, the deflocculant percentage required for attaining minimum viscosity was less for the current mixtures than for the liquid products (about 40-50% less). However, if product cost/kg spray-dried powder is considered, the results favour the latter (about 5-15% less).

- The minimum in the resulting apparent viscosity curves was the same or even lower for the liquid deflocculants.

- In no case was overdeflocculation observed, i.e., a rise in apparent viscosity after reaching the minimum.

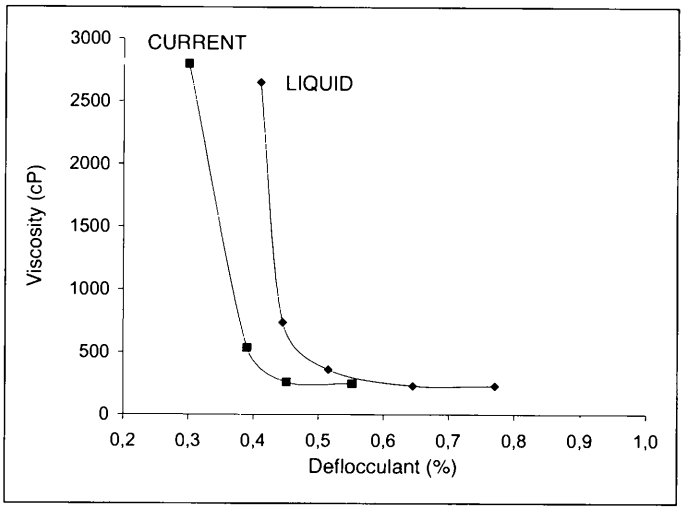

Figure 1. Variation of apparent viscosity of a white stoneware floor tile composition suspension with deflocculant percentage.

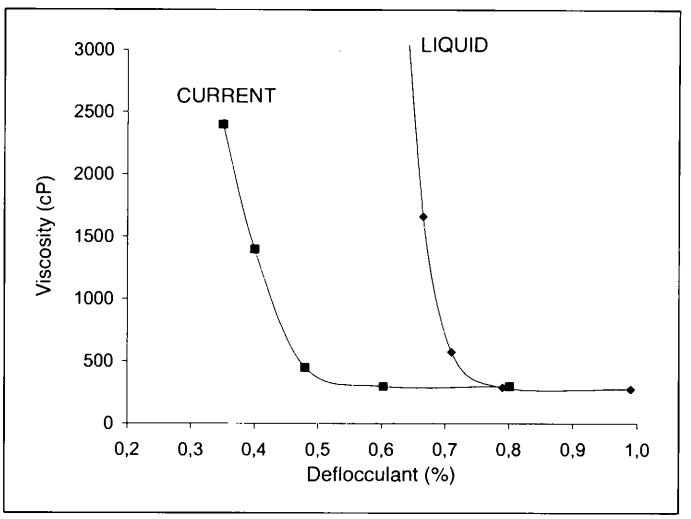

Figure 2. Variation of apparent viscosity of a porous redware wall tile composition suspension with deflocculant percentage.

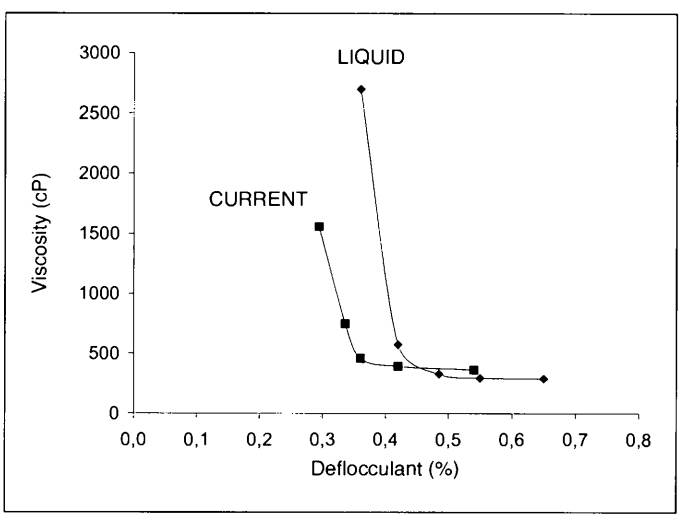

Figure 3. Variation of apparent viscosity of a porcelain tile composition suspension with deflocculant percentage.

4. CONCLUSIONS

In this study a new type of defloccuant in a liquid state has been presented, formulated from a series of organic and inorganic compounds, which can, by themselves, replace the traditional blends of metasilicate and tripolyphosphate, or the combination of these with organic compounds.

These products were tested on a laboratory scale, with certain ceramic bodies available in the market, confirming their effectiveness in every case. The findings were subsequently validated on an industrial scale.