Title: **Study of adequacy and validation of a new dynamic viscosity measurement system in paints.**

Student: Víctor Gutiérrez Grau

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Supervisor/s: Dra. Maria del Carmen Sousa Romero
Department of Materials Science and Physical Chemistry
Laure Van Ruymbeke
Akzonobel Car Refinishes

In the field of car coating, the aesthetic value of the painting is very important, as well as its main objective of protecting a surface. AkzoNobel Car Refinishes, a subsidiary of the multinational AkzoNobel that works on the automotive lining in the plastic section, has tried to match the colour of the plastic pieces to the colour of the rest of the car according to the client's specifications and obtain a painting of Quality to obtain a homogeneous car colour.

The quality control department carries out the controls of the pigmented bases, varnishes, primers that are used for the elaboration of final products. The controls that are usually made are: content in non-volatile material (MNV), density, fineness, viscosity, etc. Within the viscosity parameter, we detail that there are different methods to determine it, depending on the needs of the user. The methods to determine are: cup measurements, Brookfield viscometer, Stormer viscometer, Haake and Rheolab rheometers.

Viscosity is a fundamental parameter in the behaviour of paintings, both during the manufacturing process and in its application. Proper control of this parameter will result in better use of the paint to avoid subsequent defects during its application.

The viscosity measurement is decisive for the correct application of the chosen system, and in the extensibility and dripping of the product once applied. The viscosity varies inversely proportional to the temperature, decreasing as the temperature increases. For this reason, the application pistols require a specific degree of viscosity to operate correctly.

We must consider that excessive viscosity can lead (depending on the application method) to problems related to a high layer thickness (slow and slow curing) and with the application itself (poor spotting). On the other hand, a low viscosity could be related to low thickness of paint by layer (low covering power, high permeability) and sandblasting problems.

If the paint is very thick, it will take longer to flow through the filter. If it is too thin, the paint flows too fast and will not provide adequate coverage.

The objective of this project is to determine if the Rheolab measuring instrument is capable of being used in real operating conditions compared to the previous Haake viscometer and to determine the rheological behaviour of some products.

The aim of this study is show how affects the variation of the equipments in the properties of a product, since, each product exhibits a different viscoelastic behaviour.

To fulfil the objective, we initially carried out a series of measures with some products characteristic of the families of paintings to study (polyester, aluminium, converters and primers) with the three measuring equipment. After the evaluation of the results it is observed that some methods are poorly designed. We note that the standard method for the first ones is well designed and we decide to follow the project with this family of products.

Previously, we perform a series of measures with a thermal standard oil to validate the equipments, but we obtain that the Haake is not apt to give us a value of viscosity of quality at a shear rate of $1000s^{-1}$. Finally, we carry out the study with the primers and we obtain that the values of viscosity with the Haake are not equal to the Rheolab 1 and the 2. The equipment Haake has a lot of variability between the measures and a very large bias and due to this it has not been able to establish a correlation between the three teams.

Keywords: paint, viscosity, quality control, rheometer, Haake, Rheolab.