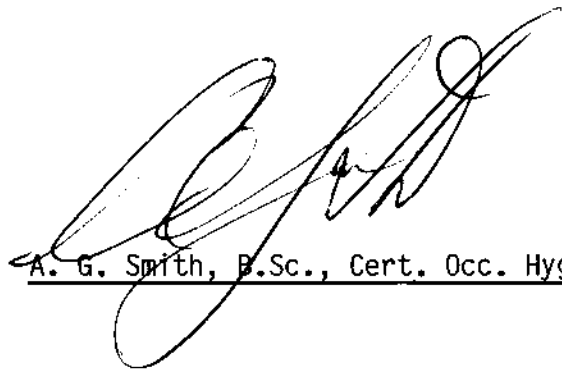


REPORT NO. 3286/82/89
REPORT ON
AN EXAMINATION OF
VINYGUARD SILVERGREY 88
FOR
JOTUN A/S PROTECTIVE COATINGS DIVISION
SANDEFJORD, NORWAY.

MAY, 1989



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AGS/MMT

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INTRODUCTION

At the request of Mr. E. Aanensen of JOTUN A/S, PROTECTIVE COATINGS DIVISION, the Occupational Hygiene Unit of Industrial Health Limited has carried out an investigation of VINYGUARD SILVERGREY 88 paint system, in order to assess, from the toxicity standpoint, its suitability for use as an interior coating for the holds of ships employed in the transport of grain.

This report describes the investigation, presents the results and comments on the possibility of grain cargo contamination.

THE TEST MATERIAL

The paint system under test consisted of the following: one coat of VINYGUARD SILVERGREY 88 to a dry film thickness of 80 microns.

A study of the formulation of the paint indicated that the most likely sources of cargo contamination are:

- 1) vaporization of binder constituents from the dried coating,
- 2) vaporization of trapped solvents from the dried coating.

INVESTIGATION

The investigation was carried out during the month April, 1989.

Method

The paint was tested in the laboratory under simulated field conditions. A sheet of shotblasted mild steel plate measuring 12" x 12" x 1/16" was coated on one side with the paint as described above. Fourteen days were allowed to elapse between the application of the paint and the commencement of the test. A wooden box, with removable sides, each measuring 12" x 12" was constructed so that when the steel plate was fixed in position, coated side facing in, a completely closed container of one cubic foot capacity was formed. The box was filled with wheat grain free from fungicides or preservatives of any kind. Tubular wire mesh sampling

'thieves' were set into the grain, parallel to the plane of the steel plate, so that grain samples at different fixed distances (1" to 10") from the coated surface could be withdrawn at a later stage. The joints of the filled container were carefully sealed and the box and its contents were kept at a temperature of 20°C for twenty-one days. A control sample of grain of similar bulk was treated in the same manner except that it was not exposed to the paint coating. At the end of the test period, the box was opened and the sampling 'thief' nearest the coated surface was withdrawn. This grain sample was then examined for toxic constituents of the types listed below.

Solvents

A minute volume (1 ul) of an acetone extract of control grain and exposed grain were placed on a suitable column and analysed by means of a gas chromatograph using a flame ionization detector.

Binder Constituents

Because of the complex chemical nature of the binders used in the system, it was decided to carry out a simple but sensitive taste test on the exposed grain. A panel of ten volunteers were asked to taste the following samples:

- (1) A reference sample of control grain. The subject was informed that this grain was uncontaminated.
- (2) A sample of control grain presented 'blind'.
- (3) A sample of exposed grain presented 'blind'.

Samples two and three were presented to each subject in random order, and a simple 'yes' or 'no' answer elicited to the question, "Does this sample taste different from the reference sample?". Between each tasting the subject's mouth was rinsed out with distilled water. After an interval of two hours, the whole series of tests was repeated.

Results

Solvents - A comparison of the chromatograms of the acetone extracts of control grain and exposed grain showed that no trace of solvents was present in the exposed grain lying close to the coated surface.

Taste Test - None of the ten subjects taking part in the tests were able to detect any difference in the taste between the 'blind' samples of exposed grain and the reference sample of control grain. This is firm evidence that none of the strongly tasting binder components were present in the exposed grain lying close to the surface coated with the paint system.

DISCUSSION OF RESULTS

The results show that toxic components of the system do not contaminate stored grain under laboratory test conditions, and are therefore most unlikely to do so during the carriage of grain in ships' holds. Even supposing that under field conditions, traces of the system's components are transferred to the thin layer of grain in direct physical contact with the coating, the dilution factor involved when the cargo is transferred is so great as to place grain cargo contamination far beyond the limits of detection, and completely insignificant as compared with, say contamination due to the waste products of vermin infestation or deliberately added fungicides or pesticides.

SUMMARY AND RECOMMENDATIONS

VINYGUARD SILVERGREY 88 paint system has been tested in order to determine whether toxic constituents are likely to contaminate cargoes when this product is used as an interior surface coating for the storage holds of grain transporters.

The results of the tests indicate that when the system is applied as recommended, there is no likelihood of dry cargo contamination.