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CANADA CENTRE FOR MINERAL AND ENERGY TECHNOLOGY
(Former Mines Branch)

EXPLOSIBILITY TESTS ON THREE SAMPLES OF POWDER COATINGS FOR MOBIL PAINT COMPANY (Job No. 4078)

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ENERGY RESEARCH LABORATORIES
SOLID FUELS ANALYSIS AND STANDARDIZATION

AUGUST 1975

ENERGY RESEARCH LABORATORIES
REPORT ERP/ERL 75-99 (TR)

Explosibility Tests on
Three Samples of Powder Coatings
for Mobil Paint Company

Job No. 4078

by

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INTRODUCTION

Three samples of powder coatings were submitted by F.W. LaRoche, Technical Director of the Mobil Paint Company, West Hill, Ontario as per letter dated July 30th, 1975, (appendix A) requesting explosibility tests. The samples were designated as Grey, non-metallic epoxy coating, Grey, metallic epoxy coating, and aluminum powder. For laboratory purposes the samples were numbered as follows:

Laboratory Number	Description
3137 - 75	Aluminum powder 611NL
3138 - 75	Grey, non-metallic epoxy powder coating 1000-A-10
3139 - 75	Grey, metallic epoxy powder coating 1000-A-17

The following determinations were carried out on each sample:

1. Minimum Ignition Temperature of a dust cloud using the Godbert-Greenwald apparatus (tube furnace).

2. Minimum Explosive Concentration of a dust cloud using the Hartman Apparatus (spark ignition).

TEST RESULTS

Minimum Ignition Temperature

3137 - 75	Aluminum Powder	700°C
3138 - 75	Grey, non-metallic epoxy powder	850°C
3139 - 75	Grey, metallic epoxy powder	810°C

Minimum Explosive Concentration

3137 - 75	Aluminum Powder	0.049 oz/cu ft
3138 - 75	Grey, non-metallic epoxy powder	0.056 oz/cu ft
3139 - 75	Grey, metallic epoxy powder	0.068 oz/cu ft

CONCLUSIONS

The ignition temperatures of dust clouds of the materials under test are consistent with their composition according to U.S. Bureau of mines reports on the subject. The addition of 3% aluminum powder to the epoxy powder lowered the ignition temperature somewhat as might be expected. Forty degrees at that temperature level would not be a serious consideration.

The Minimum explosive concentration of the mixture, Grey Metallic Epoxy coating, increased over the constituents; this is probably due to a change in the dispersibility caused by electrostatic attraction of the particles resulting in some agglomeration.

In conclusion it would appear that the relative explosibility of the mixture of epoxy powder and aluminum is not increased over the epoxy powder alone.

Appendix A

Mobil Paint Company

P.O. BOX 200
645 CORONATION DRIVE
WEST HILL, ONTARIO
M1E 4R6
TELEPHONE (416) 284-1681

TELEX 02-29429

July 30, 1975.

Government of Canada,
Head Energy Research Centre
Energy Research Laboratory
ER.1 Laboratory
555 Booth Street,
Ottawa, Ontario.
K1A 0G1

ATTENTION: Mr. W.J. Montgomery

Gentlemen:

We are manufacturers of powder coatings which are thermosetting and electrostatic spray applied and are manufactured from either epoxy or oil free polyester polymers.

We have recently developed an aluminum pigmented variety but because of the nature of this product, it has to be blended in powder form rather than the usual method of melt mix extrusion. We are concerned, therefore, with the explosibility of such a mixture and we ask for your co-operation in running some tests on our behalf.

We are mailing, under separate cover, samples of the base epoxy powder, aluminum powder and a mixture of 99.2 parts to 0.8 parts by weight which is how we intend to market the product. Also enclosed are the formulae for the two products which may help you in setting up the minimum explosion level.

If there is any further information required, please do not hesitate to contact the undersigned.

Yours truly,

F.W. LaRoche,
Technical Director.

FWL:jg
Encls.

Grey Epoxy Powder Coating 1000-A-10

Epoxy Resin	32.01	Dow DER 663U
Maleic Ester Resin	19.00	
Flow Additive	3.60	Dow SD 673
Polyethylene	0.14	
Hardener	0.85	Dow DEH 40
Dicyandiamide	0.85	
Red Iron Oxide	0.12	
Titanium Dioxide	7.00	
Med Yellow Chrome	0.28	
Carbon Black	0.13	
Calcium Carbonate	18.02	
Aluminum Silicate Clay	18.00	
Total	100.00% by wt.	

AV particle size 60 micron S.G. 1.5

Grey Metallic Epoxy Powder Coating 1000-A-17

1000-A-10	99.2	
* Aluminum Powder	0.8	99% non leafing powder 10% retained on 325 mesh
Total	100.00% by wt.	

*Canbro 611 NL Powder