U.S. Department
of Transportation

**Research and
Special Programs
Administration**

400 Seventh Street, S.W.
Washington, D.C. 20590

MAY 14 1999

Ref. No. 99-0044

Mr. Jerry F. Dyben
Fire Star Electric Match
Post Office Box 533
New Haven, IN 46774

Dear Mr. Dyben:

This is in response to your letter dated February 16, 1999, requesting clarification on the proper classification and shipment of your rocket motor ignitor kit under the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180).

Under § 173.22 of the HMR, it is the shipper's responsibility to properly classify and describe a hazardous material. This Office generally does not perform this function. However, we provide assistance when we have the information available. Based on the information provided in your letter, your rocket motor ignitor kit contains two products:

Bottle A
6.1 grams of magnesium powder
2.7 grams of titanium sponge powder
8.8 grams of coating solution

Bottle B (High-density Polyethylene)
17 grams of potassium perchlorate with vermiculite

According to your letter and the HMR, magnesium powder is a Division 4.3 dangerous when wet material, titanium sponge powder a Division 4.1 flammable solid material, and coating solution a Class 3 flammable liquid. If your materials meet any of the hazard class defining criteria in Part 173, they are subject to the HMR.

Based on the quantities of hazardous materials described in your rocket motor ignitor kit, and provided all provisions are met, your product may be shipped under the small quantities exception in § 173.4 of the HMR. In order to ship as a consumer commodity, materials must meet the limited quantity

990044

173.22

provisions for that hazard class in Part 173 and the definition of a consumer commodity in § 171.8 of the HMR. Both Bottle A and Bottle B may be shipped within the same box, provided they are compatible and will not react dangerously.

I hope this answers your inquiry.

Sincerely,

Delmer F. Billings
Chief, Standards Development
Office of Hazardous Materials Standards

Boothe
§173.22
99-0044

FireStar Electric Match

"We're the Light of your Rocket Motor!"

US DOT RSPA
Office of Hazardous Materials Standards
DHM10 400 7th St. South West
Washington, D.C., 20590

Dear Mrs. Deborah Boothe,

My name is Jerry Dyben and I am President of FireStar Electric Match. My home business supports an inner-city ministry through Love church in Fort Wayne Indiana. FireStar Electric Match sells a kit to the rocket community that allows the customers to make their own rocket motor ignitors. The kit contains two 1 oz. Bottles marked bottle A & B. Bottle A is a laboratory grade glass bottle with a Teflon-lined green thermoset cap that provides a tight chemical-resistant closure. Bottle B is a High-density polyethylene with threaded closure and with a valve seal.

From the 49 Code of Federal Regulations (49 CFR 173.4;) **Exceptions for Small Quantities** Revised as of Oct. 1. 1994 that FireStar Electric Match used for shipping it's kits. It also contain the small gram quantities that we are shipping that in case of fire would be of such insignificance that it would add nothing to the total fire as shown below we are dealing in teaspoonfuls of hazardous material.

Bottle A contains the mixture of Flammable Solids and rubber elastomer with the following classification in 49 CFR 172.101:

BOTTLE A

HAZARDOUS MAT.	CLASS ID	No.	PG	Labels Required	Grams
Magnesium Powder -------	4.3	UN 1418	II	Danger when wet, Spontaneously Combustible	6.1 grams
Titanium Sponge Powder ----------	4.1	UN 2878	III	Flammable Solid	2.7 grams
Coating Solution ---------	3.0	UN 1139	II	Flammable Liquid	8.8 grams

Now, at elevated temperatures both Titanium & Magnesium powders will burn in the atmosphere of both Nitrogen, Carbon Dioxide and Oxygen. However, both the Magnesium and Titanium

powders are now coated with a rubber elastomer. In the case of the Magnesium powder, it prevents the moisture from reaching the Magnesium powder and thus No Spontaneous Combustion is possible. In a water test we performed one drop of the mixture from bottle A was dispensed into a pail of water. The drop formed on the surface in an irregular pattern and no gas was produced. In addition, no spontaneous combustion and after 3 days the test was ended.

Since the entire mixture is enclosed in a 1 oz. round laboratory grade glass jar with a Teflon-lined green thermoset cap that provides a very good air tight seal. This also insures a second barrier to any moisture reaching the contents.

In a bonfire test we performed the thermoset cap on bottle A cracked allowing the gases to escape and the rubber vulcanized around the Flammable Solids so that when ignition temperature was reached it went off like a fast burning sparkler. There was NO explosion!

Bottle B (High-density polyethylene) in that same bonfire test melted around the 17 grams of Potassium Perchlorate and the whole mass (Vermiculite included) was just one mass of carbon. Again NO Explosion.

Deborah, in a telephone conversation I had with Dr. W. Chang Bureau of Explosives on Nov. 15, 1995 he stated, "This is not an Explosive!, FireStar Electric Match does NOT need DOT approval because of such small quantity". I asked him if he would please put that in writing and he refused stating that he did not want to become liable.

If that statement is not true then here are some questions I need to know the answers to:

1. Does this product and the small quantites meet the definition of hazardous material? If so what special labeling, and/or packaging requirements would apply to this product so that it could be legally shipment in the U.S.

2. If considered hazardous could this product be shipped as an ORM-D if it was to meet special packaging requirements and if so what special packaging would be required?

3. Does there exist any exemptions or party to exemptions that would allow regulatory relief for this product and if so could you please list them?

4. Can both Glass bottle A and Plastic bottle B be shipped within the same box. Both are packaged in vermiculite in the same plastic bag for shipment at this time.

Your help in this matter will be deeply appreciated.

This package had been submitted to the following agencies and conforms to conditions and limitations specified in 49 CFR 173.4: All the contents are under 30 mg.

The contents have been submitted to both:

Dr. W. Chang
Bureau of Explosives
P.O. Box 415
Short Hilles, NJ 07078

Under the Title, "FireStar Electric Match Confidential". In November 7, 1995 and was approved.

The above report was also sent to:

Director
Office of Hazardous Materials Regulation
Materials Transportation
Research and Special Programs Administration
U.S. Department of Transportation
Washington, D.C., 20590
Attn: Exemptions Branch

I received my report back with an OK stamped on the title page. I have that report in my files.
I can be reached at Phone/Fax 1-219-749-9840.

Sincerely,

Jerry F. Dyben
FireStar Electric Match
P.O. Box 533
New Haven, IN 46774

DOT_1.DOC