U.S. Department
of Transportation
**Research and
Special Programs
Administration**

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

AUG 2 0 2002

Mr. E. A. Altemos
HMT Associates, L.L.C.
603 King Street
Suite 300
Alexandria, VA 22314-3105

Ref. No. 02-0159

Dear Mr. Altemos:

This responds to your letter requesting a determination that an article, i.e., a valve for internal combustion engines (e.g., automobile or aircraft engines) containing a small quantity of sodium or potassium sodium alloy encapsulated and sealed within the valve cavity by welding, is not subject to the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180). You provided information, as follows:

> The valves vary in size, the largest is approximately five (5) inches in length. The outside appearance of the valves are similar to other internal combustion engine intake or exhaust valves. However, to aid in transferring heat down the stem and away from the head -- which is directly exposed to the high temperatures attained in the engine cylinder during operation -- a small quantity of sodium or potassium sodium alloy is contained in a cavity inside the valve. The maximum quantity of material contained in the valve cavity is 1.6 grams, and the cavity is not filled to more than 65% of its volume, allowing room for expansion of the material under all operating conditions to which the valve would be subjected in an operating engine.
>
> The valves are inspected by performing non-destructive testing to ensure that they are free of defects that could cause failure of the valve and release of its contents. The minimum melting temperature of the steel used in the valves is 2,500°F, and the filled valves are subjected to heat treatment at temperatures ranging from a minimum of 830°F to a maximum of 2,050°F, without failure or release of contents. Valves are designed, and some are tested, to ensure that they do not fail or leak when subjected to lateral bending loads that induce stress levels in walls of the cavity of approximately 50,000 psi. The valves may be expected to retain their contents when subjected to mechanical shocks or crushing if involved in transport or handling accidents.

Based on the information provided, it is our determination that 1.6 grams or less of sodium or potassium sodium alloy encapsulated and sealed by welding within a valve for an internal combustion engine is in a quantity and form that does not pose a hazard in transportation and, therefore, these articles are not

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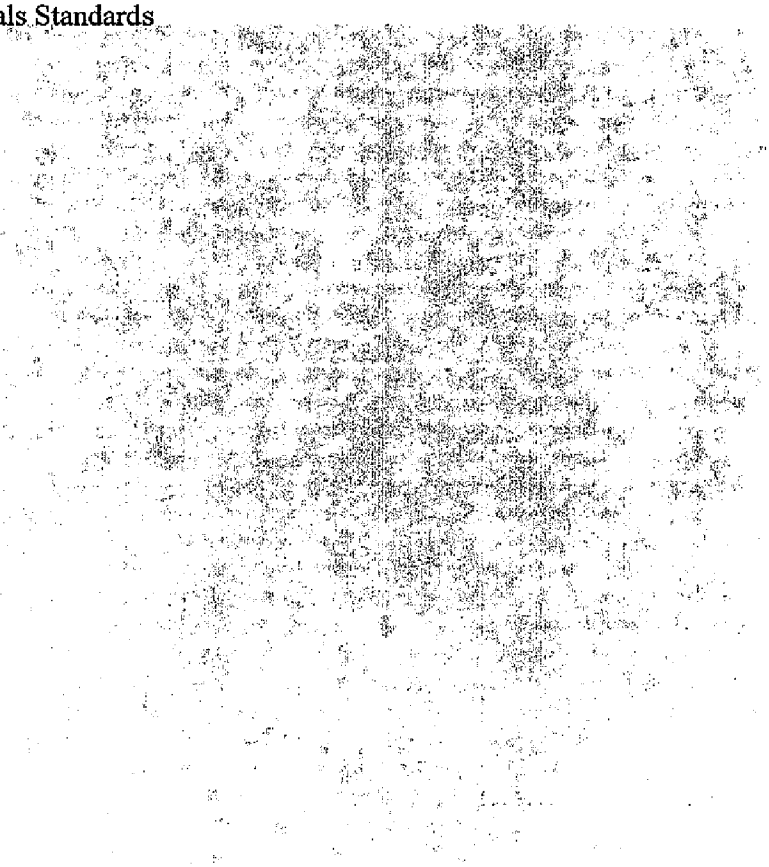
subject to the HMR. This determination does not apply to valves containing more than 1.6 grams of sodium or potassium sodium alloy, which must be shipped in conformance with all applicable requirements of the HMR.

I hope this satisfies your inquiry. If we can be of further assistance, please contact us.

Sincerely,

for Edward T. Mazzullo
Director, Office of Hazardous
Materials Standards



Engrum
§ 172.101 (PS)
Proper Shipping Name
02-0159

HMT ASSOCIATES, L.L.C.

603 KING ST.
SUITE 300
ALEXANDRIA, VA 22314-3105

703-549-0727

FACSIMILE: 703-549-0728

E.A. ALTEMOS
PATRICIA A. QUINN

WRITER'S DIRECT DIAL NUMBER
(703) 549-0727, Ext. 11

May 16, 2002

Mr. Edward T. Mazzullo
Director, Office of Hazardous
Materials Standards (DHM-10)
Research and Special Programs
Administration
Department of Transportation
Washington, D.C. 20590-0001

Dear Mr. Mazzullo:

Further to my recent conversation with Dr. Charles Ke of the Sciences Branch, Office of Hazardous Materials Technology, this is to request a determination that an article in which a small amount of a hazardous material is encapsulated is not subject to regulation in transportation under the Hazardous Materials Regulations ("HMR", 49 CFR Parts 171-180) since in that quantity and form the article presents no hazard to life or property in transportation. As you know, § 5103(a) of the Federal hazardous materials transportation law (49 U.S.C. § 5101, et seq.) provides that both the quantity and form in which a material is transported is to be taken into account in determining whether transporting that material in commerce poses an unreasonable risk to health and safety or property, and, therefore, the material should be regulated in transport.

The articles concerned are valves for internal combustion engines (e.g., automobile or aircraft engines). The valves vary in size, with the largest being approximately five (5) inches in length. In their outward appearance, the valves are similar to other internal combustion engine intake or exhaust valves. However, to aid in transferring heat down the stem and away from the head - which is directly exposed to the high temperatures attained in the engine cylinder during operation - a small quantity of sodium (UN 1428) or potassium sodium alloy (UN 1422) is contained in a cavity inside the valve. The maximum quantity of material contained in the valve cavity is 1.6 grams, and in no case is the cavity filled to more than 65 % of its volume - thereby allowing ample room for expansion of the contained material under all operating temperatures and conditions to which the

valve would be subjected in an operating engine. In fabricating the valves, once the sodium or potassium sodium alloy is placed in the cavity, the cavity is sealed by welding. Each valve, including this weld, is inspected by performing non-destructive testing to ensure that it is free of defects that could cause failure of the valve, and release of its contents.

Thus, the small quantity of sodium or potassium sodium alloy is fully encapsulated, and permanently sealed within the valve. There is no possibility that the contained material will be released under normal conditions of transport, and, therefore, the material poses no hazard under those conditions. Moreover, the valves would likely retain their contents even in the case of fire or accident. The minimum melting temperature of the steel used in the valves is 2,500°F, and the filled valves are subjected to heat treatment at temperatures ranging from a minimum of 830°F to a maximum of 2050°F - obviously without failure or release of contents. In terms of resistance to mechanical damage, quite clearly the valves must be designed to operate without failure under extreme conditions of temperature and mechanical loadings encountered in an operating engine. Valves are designed, and some are tested, to ensure that they do not fail or leak when subjected to lateral bending loads that induce stress levels in walls of the cavity of approximately 50,000 psi. Thus, the valves may be expected to retain their contents even when subjected to mechanical shocks or crushing as may be associated with typical transport or handling accidents.

In conclusion, owing to the very small quantity of hazardous material involved, and its fully encapsulated, permanently sealed form, the valves concerned pose no hazard to health and safety or property under normal conditions of transport. Accordingly, it is requested that a determination be made that the valves described above are not subject to the HMR in transportation.

Thank you for your consideration in this matter. Please do not hesitate to contact me if you have questions concerning this request, or if you require additional information.

Sincerely,

E. A. Altemos

cc: Dr. Charles Ke (DHM-21)