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NATIONAL RESEARCH COUNCIL OF CANADA

DIVISION OF BUILDING RESEARCH

No.

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TECHNICAL NOTE

NOT FOR PUBLICATION

FOR INTERNAL USE

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SUBJECT The Use of Chlorobromomethane as Fire Extinguishant

Chlorobromomethane is one of a small group of extinguishing agents called vaporizing liquid extinguishing agents of which the most common are carbon dioxide, carbon tetrachloride, methyl bromide, chlorobromomethane, difluorodibromomethane and trifluorobromomethane. Methyl iodide has also occasionally been tried. These extinguishants have been developed and tested for a very specific purpose; that is the rapid extinction of small and incipient fires in risks involving flammable liquids (class B fires).

The extinguishing capacity of these agents depends, indeed, on their influence on the chemical reactions involved in the combustion and they provide only a small and relatively unimportant cooling effect. They are therefore markedly less efficient than water in extinguishing fires in wood and other solid materials (class A fires) where cooling effect is the main effect required. They can, however, be used safely on electrical equipment (class C fires) since they are electrically non-conductive (1).

To determine the over-all suitability of a particular agent in combating fires in burning liquids, definite criteria have been defined. They can be listed as follows in order of decreasing importance: availability of the chemical substance, its relative efficiency, the toxicity of the agent as well as that of its decomposition products, its tendency to promote corrosion, and finally its cost.

Availability

If we exclude difluorodibromomethane and trifluorobromomethane, the supply of which is still rather limited, all the other agents referred to above are otherwise readily available on the market as extinguishing agents (2).

Efficiency

Results of tests obtained in various laboratories show that chlorobromomethane and trifluorobromomethane are both as good, if not better than, methyl bromide, which is the most efficient of the agents now in common use (1,3,4,5), and consequently that chlorobromomethane is much more efficient than carbon tetrachloride and carbon dioxide (1).

Toxicity

The accidental discharge or possible leakage of the fire extinguishing system used in conjunction with vaporizing liquid agents, along with the consideration of the products of decomposition of these agents when used to extinguish a fire, imposes a requirement that the least toxic agent must be used that is otherwise satisfactory (2). Carbon dioxide is well recognized as a non-toxic agent. All the other vaporizing liquid extinguishants are toxic to varying degrees. In the case of chlorobromomethane, Watson and Dufour (6) have shown that it is of the same order of toxicity as carbon tetrachloride.

Corrosive Effects

Chlorobromomethane, like all vaporizing liquid agents except CO₂, may produce small amounts of halogen acids which will attack metals (1). This imposes restrictions on the nature of the materials used for the containers (corrosion-resistant steel has proven to be quite adequate in this respect (2)) and also in the use of these agents around expensive electronic equipment.

Chlorobromomethane has been found (1,2) to be the worst of all the halogenated agents used in fire extinction in this respect, but can be generally said to have approximately the same effect on metals as carbon tetrachloride, whereas CO₂ is inert.

Cost

The following list of prices has been obtained from the literature data published in 1954 and applies to either United States (2) or to United Kingdom (1).

	<u>U.S.</u>	<u>U.K.</u>
Carbon dioxide	Cheap	Cheap
Carbon tetrachloride	Cheap	Cheap
Methyl bromide	0.55/lb	5s.0d./lb
Chlorobromomethane	0.55/lb	7s.0d./lb
Trifluorobromomethane	4.00/lb	L2.10s. - L3.0s./lb
Difluorodibromomethane	6.00/lb	-

Conclusions

In brief, of the four readily available agents chlorobromomethane is definitely the most satisfactory since it combines high efficiency with relatively low toxicity compared to methyl bromide, and reasonable cost.

References

1. Report of Committee on Vaporizing Liquid Extinguishing Agents. (D.S.I.R. Fire Research Tech. Paper No. 2, H.M.S.O., London, 1954).
2. Halogenated Extinguishing Agents (VI). A.V. Stamm; N.F.P.A. Quart. 48, 156 (1954).
3. Review of the literature pertinent to fire-extinguishing agents and to basic mechanisms involved in their action. G. Fryburg (Nat. Advisory Committee for Aeronautics Technical Note 2102, Washington, 1950)
4. Effect of methyl iodide and chlorobromomethane on the limits of inflammability of n-hexane in air. E.H. Coleman, Fuel 30, 114 (1951).
5. A comparison of the extinguishing effects of chlorobromomethane, methyl iodide and carbon tetrachloride. E.H. Coleman (F.P.A. Technical Booklet No. 11, London 1952).
6. The life hazards and nature of the products formed when chlorobromomethane extinguisher liquid is applied to fires. A.F. Matson and R.E. Dufour; Underwriters Labs. Bulletin of Research No. 42 (Chicago - 1948) .