MIXING OF DIFFERENT TYPES OF DRY CHEMICAL AGENTS

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Agent Types

Different types of dry chemical agents have been developed to achieve optimum effectiveness against different types of fires. While other types of dry chemical agents have been developed and are used by other manufacturers in their equipment, Ansul extinguishers employ only the agents designated Foray, Plus-Fifty, or Purple-K. These agents are categorized according to two "base groups," as follows:

Base Group I	Agent Type	Fire Classification
Monoammonium Phosphate	Foray	A:B:C
Base Group II	**Agent Type**	**Fire Classification**
Sodium Bicarbonate	Plus-Fifty	B:C
Potassium Bicarbonate	Purple-K	B:C

Agent Mixtures

Ansul extinguishers have been developed to provide optimum fire fighting efficiency by means of carefully matched hardware and extinguishing agents, and should be recharged only with the dry chemical agent specified on the extinguisher label. A mixture of dry chemical agents should never be used to recharge an extinguisher. While mixtures of agent types within the same base group may be harmless, unpredictable extinguishing effectiveness may result. On the other hand, mixing of agents from different base groups (for example, Foray with Plus-Fifty) has been demonstrated to not only produce ineffective extinguisher performance, but may also be dangerous.

Mixtures Problems

When Base Group I and Base Group II dry chemicals are mixed together in a tightly sealed extinguisher, a chemical reaction may occur, causing a pressure rise. The degree and rate of reaction between the two differing agents will vary dependent upon quantities involved, degree of homogeneous mixing, the moisture content of the agents, and the temperature at which the extinguisher is stored. Once the reaction starts, it will be self-propagating and will continue until the reactive substance in the lesser amount of dry chemical agent is consumed. The reaction will produce ammonia and carbon dioxide gases. Other substances including moisture are also produced, resulting in the caking of the material.

Test Data

The adverse effects of mixing dry chemical agents from different base groups has been confirmed by tests performed by Ansul's Research and Development Department. In these tests, varying mixtures of dry chemicals from the two different base groups were used to charge 10 lb. stored pressure extinguishers which were maintained at ordinary room temperature for varying time periods. After only a 24 hour storage period, the original 195 psi (1345 kPa) charged pressure of the extinguishers had risen to as high as 350 psi (2413 kPa). After a 6-day storage period, pressures had risen to as high as 400 psi (2758 kPa). When extinguishers were discharged, agent discharge as low as 45 percent was experienced.

Recommendations

Based on our experience and our evaluation of test results, we recommend that persons who recharge extinguishers follow these guidelines:

- Never recharge an extinguisher with a mixture of different types or brands of dry chemical agents.
- Never "convert" an extinguisher by recharging with any type of agent other than that for which it was designed.
- For optimum effectiveness, recharge extinguishers only with the agent specified on the extinguisher label.
- Exercise care in storing recharge agents to lessen the likelihood of moisture contamination, or that any kind of mixing or misuse can occur. It is best to store recharge agents in separate groups, by agent type.