



# Re-Use of Dry Chemical Agents

## Background

The NFPA Standard for Portable Fire Extinguishers (NFPA 10-1981) requires a six-year teardown of stored pressure type dry chemical extinguishers and the state of California requires a teardown on an annual basis. It may also be necessary to empty cartridge-operated extinguishers on the occasion of a hydrostatic retest procedure, or for other reasons. Consequently, questions have arisen relative to the re-use of dry chemical agent which has been removed from the extinguishers.

The information presented in the bulletin reflects the results of tests conducted by Johnson Controls, the consensus opinion of our technical experts, and our considerable field experience over many years.

## Dry Chemical Composition

Quality dry chemical suppressing agents consist of a carefully balanced mixture of particle sizes. This is known as particle size distribution. Any event which changes this particle size makeup and distribution can seriously affect the suppressing effectiveness of the agent. Accordingly it is important to the optimum performance of an extinguisher that the integrity of the dry chemical be maintained in the state in which it left the manufacturing process.

## Emptying by Discharge

We have found that the discharge of dry chemical from a pressurized extinguisher by means of the normal operation of the unit into an open container or discharge bag will result in an unacceptable loss of the essential fine particles of the agent. This method of agent capture has been shown to upset the particle size distribution through the loss of at least 2% of the particles. Since most of the loss involves the "fine" particles, there is a consequent adverse affect on the suppression effectiveness of the agent.

## Emptying by Dumping

Cartridge-operated and unpressurized stored pressure extinguishers can be emptied by dumping the dry chemical into an open container such as a pail or drum. Tests have shown that this recapture method may also result in the loss of some fine particles. This change in the particle size distribution, while not nearly as severe as with the discharge method described above, can affect the suppression effectiveness of the agent.

## Contaminants

The effects of humidity and moisture can adversely affect the storage, discharge and suppression characteristics of a dry chemical agent. It has been established that any means of recapturing dry chemical which is open to the atmosphere may result in moisture contamination, with subsequent caking and lumping of the agent. This contamination process increases in severity in atmospheres characterized by high relative humidity and low temperatures.

## Closed Vacuum Recapture

Tests have shown that when a properly functioning vacuum fill/discharge machine or device is used to recapture dry chemical, the integrity of the particle size distribution can be maintained and the danger of moisture contamination greatly reduced. Such devices are available from a number of sources.

## Recommendations

Based on our experience and evaluation of test results, we recommend that persons who wish to re-use dry chemical agents carefully follow these guidelines:

- Select a dry, warm and preferably enclosed location, with atmospheric conditions of not more than 55% relative humidity and ambient temperatures of not less than 65 °F (18 °C).
- Assure that any device used to hold or store the dry chemical is absolutely dry and clean.
- Never discharge a pressurized extinguisher's dry chemical into any container which is open to the atmosphere – use a vacuum fill/discharge device in good condition.
- The preferred method of recapture of dry chemical emptied from a non-pressurized extinguisher is to use a closed vacuum fill device. However, if the constraints outlined above are closely followed, the agent may be re-used after being dumped into an open container. Exposure to the atmosphere must be kept to a minimum.
- If an acceptable device or means for recapturing the dry chemical is not available, discard the old agent and refill the extinguisher with a fresh supply of the recharge agent specified on the extinguisher label.

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