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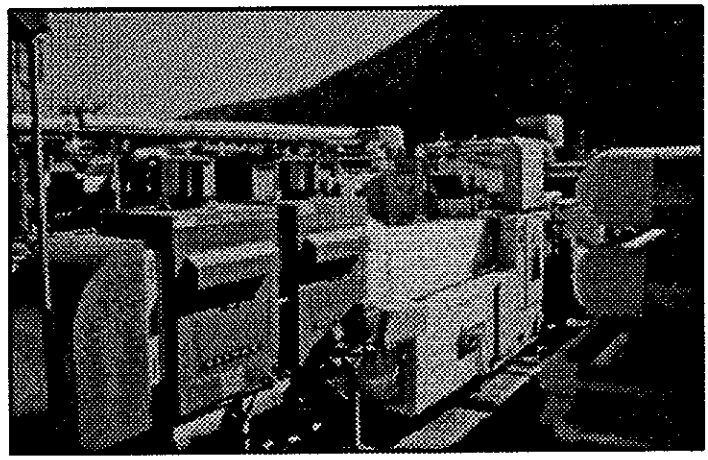
Desiccant Dehumidifiers in Film and Tape Archives

By Peter H.O. Dahlbeck

"According to the Image Permanence Institute, under the current storage conditions, the film will last for about 1,000 years, which is much longer than the building will last," said Dean G. Watts, Director of Media Archive Services for Warner Bros.

Star Wars, the sci-fi feature film that people across the country flocked to see in the 1970s, was rereleased this year. And once again, Americans packed movie theaters nationwide to relive the life sagas of Luke Skywalker, Princess Leia, and the evil Darth Vader.



Even though it was first released only 20 years ago, the original film stock for this masterpiece had deteriorated to such an extent that significant expenditures of time and money were required for restoration.

Unfortunately, there are classic feature films and television shows shot on film that, through the years, have not fared well because of inadequate storage conditions. While most can be restored to their original form, the restoration process is costly and time-consuming.

That's one reason why Warner Bros. is using desiccant dehumidification to obtain the necessary cold storage conditions for feature movies and television shows on film.

Because desiccants are effective at removing moisture from the air at low humidity levels and do not freeze like other dehumidifiers when operated at low temperatures, they can be used to maintain the dry, cool environment required for film and video storage.

At its studio lot in Burbank, CA, Warner Bros. opened a low-humidity cold storage facility in 1992. It uses four desiccant dehumidifiers to maintain proper conditions in six vaults. Based on the American National Standards Institute's (ANSI) 1991 recommendations for film storage, Warner Bros. safeguards original negatives at approximately 35°F with a relative humidity (RH) of 30%, while preprints and magnetic materials are stored at 45°F with 30% RH.

The vaults are continuously monitored for temperature, relative humidity and contaminants, while the doors into the vaults are checked frequently for leaks. If the air handling equipment had to be shut down for a week, the temperature and humidity would fluctuate only slightly — within 5°F and a 5% variance in RH.

"The main purpose is first to stop deterioration and, second, prevent the color film from fading," said Dean G. Watts, director of media archive services for Warner Bros. "According to the Image Permanence Institute, under the current storage conditions, the film will last for about 1,000 years, which is much longer than the building will last."

For many years, Hollywood producers stored their film materials in underground facilities, where dry, cool environs were easier to maintain, But as the demand for using archived materials increased along with concern over the California earthquake belt, so did the demand to have on-site above-

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ground storage facilities. A few years later, ANSI released its recommendations for extended and medium-term storage of film and video in above-ground facilities.

In addition to preserving color film, black-and-white film, and magnetic tapes for historical, artistic and cultural purposes, these materials represent a major revenue source for studios, grossing millions of dollars each year. "Producers constantly use archived materials to find alternative shots or make the materials slightly different than before and more sellable," Watts said. "Our archives are a major reason for Warner Bros. existence."

According to recent ANSI standards, extended-term storage conditions, ideal for materials having permanent value, should be at 35°F or lower with 20-30% RH for color film, while black-and-white film and all magnetic tapes should be maintained at 50°F with 20-50% RH. Medium-term storage conditions, recommended for materials with an expected useful life of at least ten years, should be maintained at 70°F with 20-50% RH for both color film and black-and-white film. (This condition for film storage was revised from the original 1991 ANSI standard of 50°F and 20-30% RH. Since better results have been achieved with the 1991 recommendation, it is anticipated that ANSI will revise the standard again.) Conditions for medium-term storage of tapes should be maintained at approximately 70°F with 20-50% RH.

Because humidity is a catalyst that accelerates deterioration and reduces the lifespan of film and video, it is essential that the RH in storage be controlled according to storage standards. Desiccant dehumidifiers are one option for maintaining the low RH levels recommended by ANSI.

Unlike cooling-based dehumidifiers, which cool the air to condense its moisture, desiccants attract moisture from the air by creating an area of low vapor pressure at the surface of the desiccant. The pressure exerted by the water in the air is higher, so the water molecules move from the air to the desiccant to make the air drier. The desiccant may be either lithium chloride (which Warner Bros. uses), silica gel, or molecular sieve.

Paramount Pictures was the first Hollywood studio to use desiccant dehumidification, opening its cold storage facility in 1990. Warner Bros. followed two years later and, today, Walt Disney Studios, 20th Century Fox and Sony Pictures are also taking advantage of desiccant technology.

As Dean Watts put it, "We now have much more control of our assets."

Peter H. O. Dahlbeck is the archival market manager for Cargocaire Division, Munters Corp., a producer of desiccant dehumidifiers.

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