

VLBA ACQUISITION MEMO #328

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
HAYSTACK OBSERVATORY
WESTFORD, MASSACHUSETTS 01886

4 August 1992

Telephone: 508-692-4764
Fax: 617-981-0590

To: VLBA Data Acquisition Group

From: Daniel Callahan
Alan E.E. Rogers

Subject: Humidity tests of the tape cannister

Water Seal

The 3M two inch tape cannister (see VLBA Acquisition Memo #312) was tested for water seal by spraying with a hose for several minutes. While some water was found inside the cannister, there was no water found on the inside of an empty self-packing reel with clamping reel band. While the cannister is not completely water-tight, the seals are quite good enough to prevent the tape from direct water contact.

Effects of humidity on the tape

Since it is possible for some water to enter the cannister and the seals are certainly not airtight, some tests were conducted to see if there any adverse effects of the tapes absorbing moisture during shipment. For this test, tapes were stored in a "hot wet" box (approximately 105°F, 60% RH) for periods ranging from overnight to an entire weekend, and then mechanically tested within one-half-hour of being removed from the box. While the tapes had acquired a slight smell from the warm humid storage, there were no significant deposits left on the transport and no loss of margin in the wind test (see VLBA Acquisition Memo #'s 321 and 299). Figure 1 shows details of the "hot wet" box used for the tests and Table 1 gives some more details of the tests.

It is noted however that after storage for 60 hours that there is some tape deformation that produces tracking shifts - especially in the outer layers of the tape pack. The deformation is largely a weave with a periodicity equal to the pack circumference. Much of the deformation will relax away after several days storage. The effect may be mostly due to the non-uniformity of temperature and humidity exposure in the hot box.

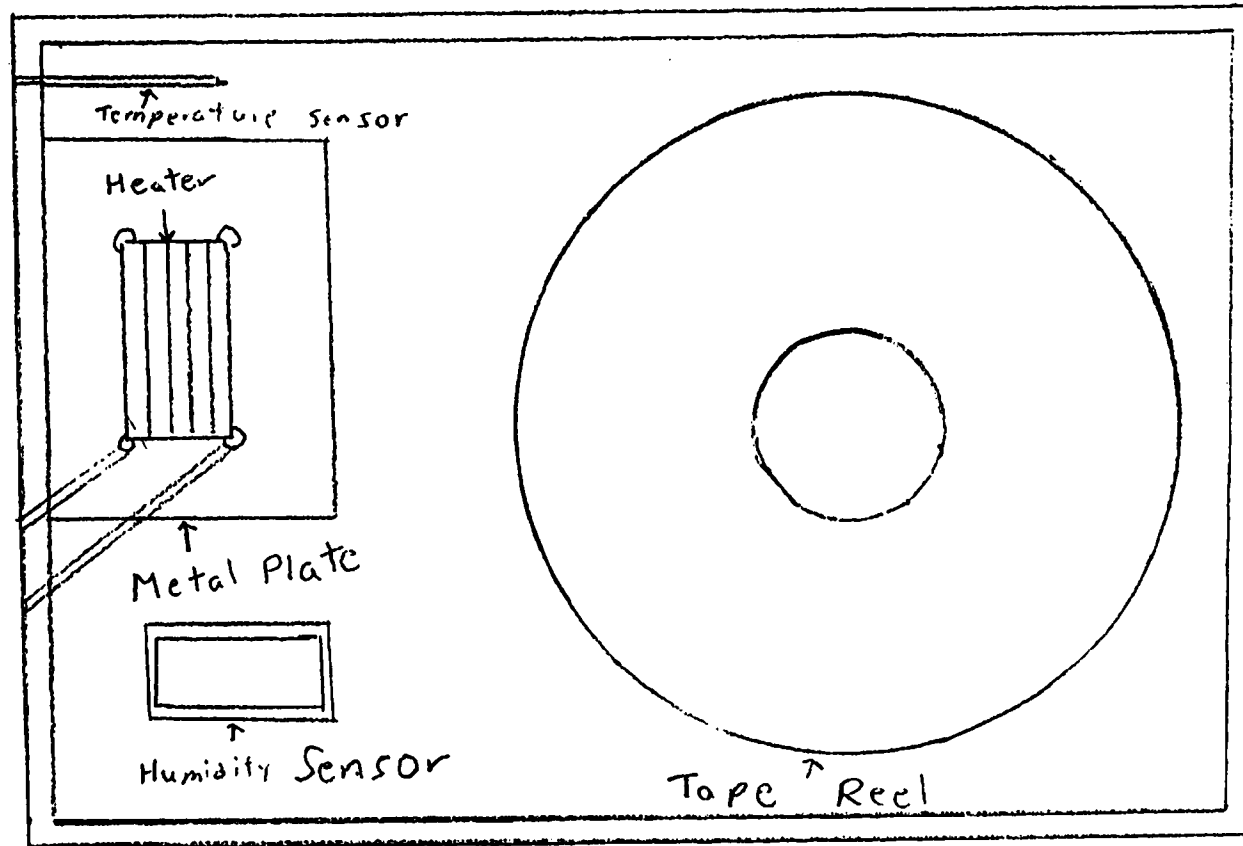
Conclusion

The tape canister doesn't prevent a high humidity from developing inside. However, tapes stored in a hot humid environment for a period of up to a few days (simulating Federal Express shipping) show no significant degradation of their mechanical properties.

Tape #	Type	Hot/Humid Storage Time (Hr.)	Comments
VLBA0064	AMPEX 741	18	Damaged by running at high ambient RH.
USNO1052	SONY D1K	60	No degradation - passed wind test.
USNO1017	SONY D1K	12	No degradation - passed wind test.
VLBA0080	3M	15	No degradation - passed wind test.
VLBA0080	3M	60	Passed wind test - large tracking shifts at beginning of tape

Table 1. List of tapes subjected to hot (~105°F) and humid (60% RH) storage.

Figure 1. Interior of Humidity Box



Top View

Note: Wet rags and temperature adjustment used to control the environment of the tape. Also, the box was insulated.