CHAPTER I

INTRODUCTION

The ongoing trend in disk-drive industry is toward smaller drives with higher storage capacities. Laptop, notebook, and palmtop computers require reduced form factors at the same time that sophisticated software applications need more disk space. Achieving high capacity in a reduced format requires lower flying heights for the read/write head, thinner disk media, smaller spindle motors, and less open space in the head/disk assembly (HDA) (1).

One of the ways to increase the recording density in hard-disk drive is to lower the spacing between the head and disk. However, a lower spacing makes the head-disk interface an extremely critical area, easily affected by even extremely minute particles or gas/vapor escaping from materials in disk enclosures. Such conditions cause failure of the head-disk interface, i.e., head-crash (2).

In addition to moisture, vapors from organic disk-drive materials can be adsorbed on heads and disks and build up liquid like condensation at the head/disk interface (2-4). When exposed to high temperatures in small regions of the interface, the adsorbed vapors can undergo chemical degradation or interact to form reaction products (2,5&6), which in turn can affect the flyability of the head and significantly increase dynamic friction at the interface. Other adsorbed organics can have beneficial effect by being lubricious, lowering the friction and acting as a protective lubricant in lube-depleted regions of a disk (7).

It is impossible to produce and maintain a 100% "clean" disk drive because all components, processes, and environments contain some contaminants. Even minor variations in materials and manufacturing at the component and drive levels can produce deleterious levels of contamination. The traditional approaches to minimizing such contamination include tightly controlling the manufacturing environment, using the cleanest possible components to minimize outgassing, incorporating breather and recirculation filters to capture airborne particulate, and, in some cases, sealing the drive from the outside environment (1). However, in some circumstances it can not be avoidable, such as in the production of certain disk drive, the manufacturer is often required or desires to provide information concerning the disk drive, for examples, company name, model name, part number, serial number, what the product is, where the product is assembled, etc. The portion of the label remains on the disk drive or inside disk drive. This information must be visible to the customer in addition to the identification of the product. When the PSA was used in the process it will be handled or contacted by the operator. This part contains an organic compound, silicone, which is harmful to hard disk. Moreover, the liner may contain the other forbidding compounds such as benzophenone, benzoic acid, organotin compounds, etc. When the PSA and the liner were handled and the other parts were touched by the operator, contamination may be introduced into the hard disk during the process. Plasticizers and organic siloxane from siliconized release liner are especially likely to affect the head-disk interface because they are released in relatively large amounts and spread very quickly (2). This problem must be concerned which may cause a big problem in the future.

The studying in release liner is interested because currently the exact criteria for this part was still not exist. However, when the PSA was studied in detail, found that there are many additive compounds besides silicone such as anions, acetophenone derivative and other compounds. It is necessary to study this release liner because there are many types of siliconized release liners in our production line. And at the present, the siliconized release liner are still used. because it is inexpensive as compared to silicone-free release liner. Even though there is nonsiliconized liner in the market but have yet qualify. Besides, it is still very expensive. Therefore, the siliconized release liner was still need to use. This leads to the study on the type and quantity of siliconized release liner for further tribology research and determination of the effect on hard disk. The tribology test is the method to study of friction, wear and lubrication on head-disk interface. When the hard disk is off, the head rests on the disc surface and when the drive is operating, the head are flying over the spinning discs at 1-2 microinches, heads can accumulate lube or contaminants while flying. During startup, the disc spin up, and the heads slide on the disc surface and the sliding causes head and disc wear, which can ultimately cause head or disc mechanical failure.

Finally, all of the above criteria must be accomplished in a manufacturing technique that insures quality and cost-effectiveness.

Objective of the Research

To study polysiloxane compounds on pressure-sensitive adhesive release liner using FT-IR analysis, dynamic headspace sample outgassing test and GC/MSD analysis,.

Scope of the Research

This research will focus on siliconized release liners from Flex Con as follows; 90-PFW, 150 Poly sth-9, Specsok-8, EX200 Poly SC-9, ST-2412014, ST-2412024, ST-2412034 and ST-2412044. Contaminants in siliconized release liners to be analyzed are type of silicone and quantity of silicone per surface area of release liners and other major type organic compounds.

Benefits of this Research

1. The type of polysiloxane compounds from pressure sensitive adhesive release liners will be known.
2. The quantity of polysiloxane was used to set the specification for release liners, which can be used in electronic industry.
3. This information can be used for further Tribological research and study the effect of these compounds on hard disk drive.