

CHAPTER V

CONCLUSION

This research was conducted to study the type of polysiloxane on pressure-sensitive adhesive release liner via FT-IR analysis, dynamic headspace sample outgassing test and GC/MSD analysis.

Results of FT-IR analysis showed the extent of silicone containing in this release liner. However, the result could not tell exactly what type of silicone. FT-IR could quantify silicone content on release liner by rinsing with hexane and using silicone calibration curve. This research found that silicone coated on 90 PFW, 150 Poly STH-9 and Specsok-8 release liners, ST-2412014 and ST-2412034 label release liners could be effectively quantified by FT-IR. Based on FT-IR analysis, release liner Specsok-8 contained highest silicone which is equal to 0.60 ng/cm^2 . And the rest of release liners contained no silicone indicating that they were silicone-free release liners. However, the silicone-free release liner is not available enough in the market and still is comparatively high cost. As a result, it is not widely used in the pressure-sensitive adhesive currently.

Based on DHS outgassing test, there was no silicone detected from the Specsok-8, 90 PFW, 150 Poly STH-9 and ST-2412014 label release liner. This might be due to its high molecular weight and low volatile silicone under testing condition at 85°C 3 hrs. However, silicone could be detected from outgassing test on release liner of ST-2412034 label. This might be due to low molecular weight silicone that was volatilized at 85°C under 3 hrs.

The silicone on release liner from Flex Con are decamethyl cyclopentasiloxane, dodecamethyl cyclohexasiloxane and isopropoxy-1, 1, 1, 7, 7, 7-hexamethyl-3, 5, 5-tris (trimethylsiloxy) tetrasiloxane. This compound could possibly be transferred to the hard disk drive during the process of manufacturing. This indicated that the hard disk assembly operators should pay more attention when they handle the pressure-sensitive adhesive.

Based on GC/MSD analysis, the results indicate that the major siloxane were dodecamethyl cyclohexasiloxane, the mixture of 1, 1, 1, 5, 7, 7, 7-heptamethyl-3, 3-bis (trimethylsiloxy) tetrasiloxane and isopropoxy-1, 1, 1, 7, 7, 7-hexamethyl-3, 5, 5-tris (trimethylsiloxy) tetrasiloxane.

The other major organic compounds could be identified from FT-IR analysis, DHS outgassing test and GC/MSD analysis to be long chain hydrocarbon, branched chain hydrocarbon, propanoic acid alkyl ester, 2-ethyl hexanol, 2, 6-bis (1, 1-dimethylethyl)-4-ethyl phenol, benzeneethanamine, octadecanoic acid methyl ester, acetic acid, terephthalate ester, benzaldehyde, ketone, benzyl alcohol, isocyanato octadecane and phthalate ester.

The silicone and other harmful compounds contained on the release liners would potentially cause the drive failure, if they were transferred to the hard disk drive. Further study that should be conducted is the tribology tests at various concentrations of silicone and some of major compounds to investigate their effect on the head-disk interface.