



# Optical Media Cleaning

*Optical media cleaning is a very important factor in maintaining the optimal performance of Optical Library systems and it is often overlooked by customers. However, proper media maintenance is essential for proper system operation, timely access to files, reduction of errors and media efficiency.*

## **What is media contamination?**

Airborne dust particles and debris in the environment can find their way onto media surfaces. The debris on the media surface can inhibit the optical laser from accessing the data recording layer of the media. Debris can migrate to other areas of the media surface as well as to the lens of the optical drives. With proper media maintenance severe problems can be prevented.

## **The impact of contamination on media**

When media is contaminated, I/O operations performed to the media can result in various issues and degraded system performance. A small particle of debris the size of a pen point can cause data access errors, impact optical drive performance, and in some cases resulting in the inability to recover data. The system will automatically try repetitive I/O retries on reads and writes including moving the media to an alternate drive to facilitate I/O operations causing unwanted delays or system errors. Additionally, read and write errors can cause a loss in media capacity and if the contaminates migrate to the optical drive it can cause drive failures and errors on other media.



## **How does media contamination occur?**

Optical media surface contamination can be caused by many sources and is largely dependent on the environmental conditions of where the system hardware is located. Printers and scanners are a large contributor to contamination and should not be located in the same room as laser disk drives. Other locations such as factory floors or office environments can be contributors. A clean computer room with filtered air can greatly extend the time between optical media cleanings.

## **Determining the frequency for media cleaning**

Optical media cleaning should be performed on a regular basis with the frequency dependent upon the environment. To determine the frequency, inspection of media and timing are key. This can be accomplished by starting with a clean piece of media, noting the date and the media serial number, inserting the media into the system, then inspecting the media monthly for surface contamination. When significant contamination is noted on the optical media surfaces, the time period has been established and media cleaning should be scheduled.

## **The Process**

Our media cleaning process is a method developed by Alliance Storage Technologies, based on our intimate knowledge as the manufacturer of archive grade optical media and drives. We first clean the exterior of the cartridge with a cleaner to prevent debris from migrating to the inside. We then use a semi-automated ASTI proprietary media cleaner. The process includes one or two cleaning phases, dependent on the level of contamination present. The first phase consists of a dry cleaning, with a second wet cleaning phase performed if necessary. This cleaning method eliminates dust and dirt less than one micron in size, without damaging the surface of the disk in any way (the same method used internally at Alliance Storage Technologies). Cleaning stages performed during these phases include:

- Spinning the media at a high speed in the proprietary cleaning station.
- Cleaning the platter surface with specialized cleaning pads.
- Utilizing a high grade cleaning solution to break down any contamination on the media surface if required.
- Dry buffing the media which will clear any residue away if required.
- Dusting the media surface with compressed air to remove airborne debris.
- Inspecting the media to ensure contamination has been eliminated.

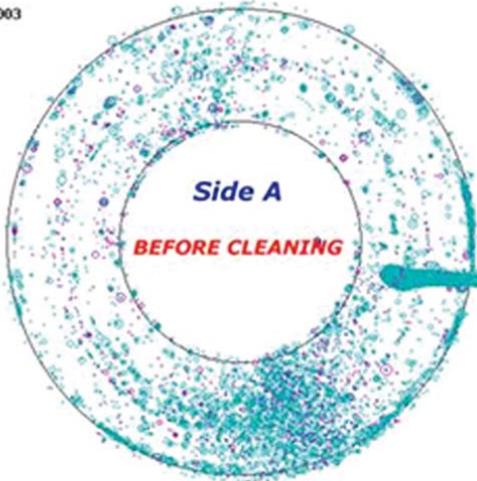
The cleaning solution is a clean room grade alcohol in which has been proven and validated by ASTI for safe use on the media surface. The cleaning pads are clean room grade lint free wipes designed for use with optical lenses. Our service technicians are highly trained in this process and have years of proven experience with media cleaning as well as optical library operations, analysis and repair services. The effectiveness of our proven process is exemplified below:

```

kktest1.adf
Thu May 22 14:13:50 2003
Upper Threshold: 233
Lower Threshold: 131
Total Dust: 19401

```

Band	Count
1	1128
2	871
3	1715
4	1993
5	3696
6	3594
7	3188
8	3216
D18128 L 19 B 1254	
10um - 15um	3227
15um - 25um	7417
25um - 35um	2983
35um - 45um	1560
45um - 55um	1066
55um - 65um	612
65um - 75um	389
75um - 85um	233
85um - 95um	164
95um - 105um	127
105um - 150um	329
150um - 200um	130
200um - 250um	47
250um - 300um	62
> 300um	552



Platter 1 Side A  
Initial Scan of Disk Before Cleaning  
Total Particulate Count = 19401

Dust and contaminants cannot hide from the manufacturer's particulate analyzer, but they can easily hide from an untrained eye. The manufacturer states a maximum acceptable particulate count per side of 12" media to be 500. A particulate count over 250 per side will begin to impact the maximum capacity of your optical media. The proof is in Alliance's numbers...**less than 375 particulate counts on both sides combined after cleaning.**

```

kktest2.adf
Thu May 22 14:29:08 2003
Upper Threshold: 230
Lower Threshold: 129
Total Dust: 166

```

Band	Count
1	31
2	13
3	20
4	8
5	4
6	9
7	38
8	43
D 143 L 6 B 17	
10um - 15um	26
15um - 25um	69
25um - 35um	33
35um - 45um	10
45um - 55um	9
55um - 65um	2
65um - 75um	5
75um - 85um	1
85um - 95um	0
95um - 105um	2
105um - 150um	4
150um - 200um	0
200um - 250um	1
250um - 300um	1
> 300um	0



Platter 1 Side A  
Scan of Disk after Cleaning by MFM  
Total Particulate Count = 166

**Alliance Storage Technologies, Inc.** offers professional optical media cleaning services at your site, or at the Alliance Storage Technologies technical facility.

Media technicians are factory trained and have proven experience. The only media cleaning company trained to properly, safely clean data storage media as well as provide hardware maintenance services on drives and libraries.

Our media cleaning systems are designed specifically by the manufacturer of the optical media providing for best results. We have media cleaners for cleaning all UDO, MO, and 12-inch media types.

**To obtain a quotation or learn more about our media cleaning services or data archiving solutions, please contact us at: 719 593 7900, or visit our website [www.alliancestoragetechnologies.com](http://www.alliancestoragetechnologies.com).**

#### About Alliance Storage Technologies, Inc.

ASTI, with over 25 years of archiving experience, is the leading source for professional data archiving solutions worldwide that meet and exceed regulatory compliance demands for secure, long-term data retention. These regulatory compliance systems preserve original data for extended periods (greater than 50 years) assuring archived data remains unaltered; a necessity for vertical markets such as Healthcare, Finance, Government, Insurance, and Legal.

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