

THE 7 FATAL MISTAKES OF STORING DATA, MUSIC & PHOTOS ON CDs:

Everything you always wanted to know
about the pitfalls of burning CDs but
didn't know who to ask.

A New White Paper From
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1) Introduction and Abstract.

It has been said that the main cause of problems is solutions. That is certainly the case with CDs.

When I started researching this white paper, I, like most people, assumed that when it came to CDs you could buy them, burn them and then do what you wanted with them --without giving it another thought. I also assumed that there was little, if any, downside to their use.

What I found was the exact opposite. Recordable CDs (CD-Rs & CD-RWs) are amazingly complex and it is not as simple as it seems to successfully burn, store and mail CDs.

The purpose of this paper, therefore, is to help you identify and avoid the most common mistakes involved in burning data, music and photos onto CDs. It should help you improve your odds of burning a CD and getting it to do what you want.

To my knowledge, this is the only place you will find this information. I searched for and downloaded over 1,000 pages of raw information and it wasn't easy to find. It took 7 months and uncounted hours to find it, read it and condense it and write it for this paper.

In addition, parts of this paper are simply not available anywhere else. For example, I found nothing anywhere about which mailing product is best for different applications and how the new Post Office re-classification of CDs affects your mailing choices.

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Finally, I need to thank my customers. Much of what is in this White Paper is the contribution of generous customers who took the time to write me and share with me their experiences with CDs. Their assistance is deeply appreciated and was invaluable to me both in terms of knowing what was important and in many of the details that appear throughout.

What's involved...

The ability of CDs to accept and store data is a combination of the CD, the information to be burned, the burner, the burner software, and the manner in which the CDs are stored or used. This white paper will address all of these issues since Fatal Mistakes can be caused by any of them.

As companies and individuals come to depend on CDs, making sure (a) what you want is on the CD and (b) that you can retrieve it at will is growing and will continue to grow in importance.

2) Focus Of This Paper

There are two kinds of CDs. CD-ROMs and recordable CDS (CD-Rs & re-writeable- CD-RWs). CD-ROMs are typically mass-manufactured products like the music CDs you buy. The information on these discs, in the form of what are called "lands" and "pits" (the zeros and ones a computer reads), is molded into them at the time of manufacture. Nothing can be added or subtracted from them. They are fixed as created.

CD-R (Recordable discs) and CD-RW (Re-writeable discs), on the other hand, are Optical Media. They are basically sandwiches of a dye and a metallic layer held together by polycarbonate substrate. Information is burned onto these discs by high-powered laser. This burned information, in turn, is read by a lower-powered reading laser.

This paper will be concerned with CD-Rs and CD-RWs only. And, we will talk of them interchangeably since they share the same issues.

3) The 7 Fatal Mistakes Of Storing CDs

Ensuring the permanence of your CDs (and indeed of any modern information medium) is a combination of manufacturers' and users' responsibilities. CDs in general last longer than other digital storage media.

However, CDs are not care-free.

They are frequently handled, dropped, scratched, piled on desktops, and baked in hot cars, etc., etc. Also, there are some hidden risks and problems associated with their use. Those dangers and risks are what this white paper discusses. They are:

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- (1) How Buying The Wrong CD Can Get You Into Trouble [6 Pages]
- (2) How to Avoid Burning “Coasters”, or unusable CDs [9 Pages]
- (3) How Improper Labeling Can Destroy a CD [7 Pages]
- (4) How the Wrong Mailing Media Can Sabotage The Best Laid Plans [25 Pages]
- (5) How “File and Forget” Can Cost A Fortune [6 Pages]
- (6) How Improper Storage Can Lead to Catastrophe [30 Pages]
- (7) Neglect the Human Factor At Your Peril [3 Pages]

Helping you avoid these fatal errors will be the main concern of this paper.

4) Why This Is Important

Almost unnoticed, CDs are changing the way businesses perform many of their critical functions from selling customers, to archiving critical information, to distributing information products. For example, the traditional photo negative that has been around for something like a hundred years is on its way out. Digital cameras are taking over.

Thus, all sorts of business are entrusting their future to CDs. Such trust carries with it certain built-in risks that must be assessed and responded to. That is what I hope this white paper will help you do – avoid the preventable things that can go wrong.

In many case, it's no one fault that things go wrong. It's usually a lack of information.

For example, the difficulties of keeping information in digital form is true across digital storage media. Something like 10% to 20% of data the Viking probes sent back from Mars are on obsolete tapes and no longer available. Thousands of satellite images of Earth are stored on tapes that the US Geological Survey can't read.

If the organizations behind these projects, with all their resources and all their collective brains, could not anticipate these problems, then, in many ways, this is just the nature of digital technologies. If they knew they were going to have a problem, they would have done something about it.

And, it's both a hardware and a software problem. Technology changes and people move on without realizing the consequences of abandoning something they assumed was fixed forever. And, as I say, this paper's purpose is to help you make sure you don't find yourself in that sort of situation.

5) Why CDs Are Taking Over

Storage media, in general, can be classified according to its capacity, capabilities, speed, data availability, durability and cost. The reason CDs have become the storage media of choice is because they offer so many advantages across each of these areas. It is the only portable storage technology, for example, that is interchangeable across hardware and platforms.

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Further, CDs can store large amounts of information – 650 MBs, at minimum. This means it can hold 74 minutes of audio, 45 minutes of MPEG-2 video, hundreds of photos and up to 4 file cabinets of documents. This is far greater than other removable devices such as ZIP Drives (at 250MBs).

Therefore, they can save a company a fortune by compressing file cabinets of records down to a fraction of that space. Stacks of documents can be reduced to a simple disc. And, CDs also make it possible to create powerful, multi-media presentations economically.

In addition, there is an installed base of approximately one billion CD-ROM drives. Each of these drives can read CD based media. So you have broad compatibility. And finally, the cost of CD storage is low, just pennies per megabyte. This makes CDs the lowest cost-per-megabyte of just about any currently available storage media.

All of these advantages are what is driving the conversion over to CDs from other portable media. And, since so much about business now depends on CDs, it's important that any decisions about CDs be based on the best information available. That's what this paper will try to offer.

6) Main Summary & Conclusion Of Our Findings:

Probably the key thing that I learned, from both customers and the other research that I did for this paper is that, if you are burning CDs for a long-term purpose, you have to be much better informed about the consequences of every choice you make, than if you are doing something that is going to be quickly consumed and discarded. There are other conclusions, to be sure; but, this is the one discovery that stood out for me.

For example, if you are burning CDs that have little or no intrinsic value and will be used one-time and discarded, almost any CD that will work with your machine will be adequate. You don't have to buy an expensive, archival-safe CD. The cheapest that will burn what you want to burn is fine.

On the other hand, if you are producing CDs that have to endure for substantial periods of time, you have to choose a little more carefully. You must start with an archival quality CD.

The same with labeling your CDs. Use-and-discard CDs can use just about use any of the popular labeling methods. But, if your CDs has to endure for a long period of time you have to be much more careful in labeling them so that they are not delaminated or otherwise damaged over time.

Filing also is the same sort of thing. For CDs that must hold the information you are burning on them for long periods of time, you will have to choose something that will protect the CD from external sources of damage. But, the choice you make must also protect your CD from damage caused by that very storage medium itself.

Finally, the one major exception to this long-term/short-term distinction is in the area of mailing and distribution of your CDs In mailing CDs you have to be especially concerned with the new

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Postal Regulations that went into effect July 2002. These will have a definite impact on what you choose and how you want to mail.

If you have any questions or comments, please either e-mail us or phone us. Our e-mail is gse@cdsleeves.com & our phone is (818) 865-7942.

Summary of The 7 Fatal Mistakes and Consequences

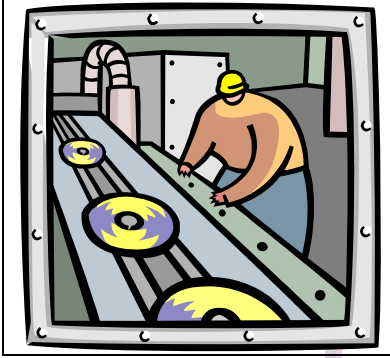
Mistake	Description	Consequences...	Remedy
#1 Using the Wrong CD [6 Pages]	Not all CDs are made with the same formula. Some are more suitable for short term use; others for Long-Term Storage	Not all CDs will protect data, music and photos over the long term. In addition, some survive the mails better than others.	Use only Mitsui Archival Quality CDs for long-term storage of data, music and photos. Use an appropriate mailing media as described in that section.
#2 How to Avoid Burning Coasters [9 Pages]	Buffer underrun is the main cause of burning a dud CD. But it is also important to “walk in your audiences shoes” and make it easy for them to use what you send	Buffer underrun ruins the CD. It is completely useless. Also useless if incompatible with your audience’s computer. And, if they don’t have clear instructions and tools, they’ll just throw it out and move on.	Follow procedures outlined in this section and you should be able to eliminate these problems.
#3 How Improper Labeling Destroys CD [7 Pages]	There are 6 popular ways to label CDs. All are ok for short-term programs; long term only one or two	Labeling a CD with the wrong material or ink can lead to the destruction of the CD over time.	Follow the labeling tradeoffs presented in this section.
#4 How the Wrong Mailing Media Can Kill the Best Laid Plans [25 Pages]	CDs can be damaged in the mails, if not protected properly	Unknown number of broken and unusable CDs delivered to your audience	Follow guidance offered in this section. Basic tradeoff is cost vs. protection

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Summary of The 7 Fatal Mistakes and Consequences (Continued)

Mistake	Description	Consequences...	Remedy
#5 How “File and Forget” Can Cost a Fortune [6 Pages]	You can't just file and forget CDs. You need to be concerned about Quality Control, Hardware and Software changes as well as Cataloging, Control and Oversight.	Can't open data, music or photo files when you need them. If IRS or forensic info or photos could be a disaster.	See recommendations. Each of these areas of concern are discussed in depth in this section and appropriate remedies suggested.
#6 How Improper Storage Can Lead to Catastrophe [30 Pages]	Delamination and failure to protect CDs from other physical and chemical damage	Using the wrong storage media over the long-term can lead to complete loss of data, music or photos stored on CDs	Each of the major and most popular storage media and the relevant tradeoffs discussed in this section.
#7 Neglect The Human Factor At Your Peril [3 Pages]	Comes under the heading of Murphy's Law: If something can go wrong, it will go wrong at the worst possible time.	Human error accounted for 53% of system crashes studied between 1985 and 1993.	Cautions and controls are discussed in this section.

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SECTION 1:

HOW BUYING THE WRONG CD CAN GET YOU INTO TROUBLE

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Introduction

I once asked a customer how long he expected his CDs to last.

He said: "Forever!"

He was in a furniture business and they would work intensely for weeks to get the design right. Once the design -- and especially the colors -- were where they wanted them, they would lock in the design and burn a CD. The CD would then go into a job folder and they wanted it to stay accessible and fixed permanently.

There was a problem, however. These were CD-Rs and he was buying his blanks on a spindle at the local office supply store. They were something like 22¢ each; made in Mexico or Taiwan; and built and sold strictly for price.

There's nothing wrong with that. But, it wasn't the right product for what he wanted to do.

1) All CDs are not created Equal

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What he didn't know was that all CDs are not created equal and these CDs would never make it to forever. In the job jacket, they might last a year or two. Possibly longer. But, one of the ways manufacturers are able to get the price of CDs down is to tinker with the formula. When they tinker with the formula, frequently they reduce the life-expectancy from 100 years to hours, in some cases!

Choosing a good CD is one of the more confusing areas in this whole business. You have to choose among a wide assortment of prices, unknown brands, conflicting claims, etc., when all you want is a CD that will do the job you have in mind, for a reasonable price.

The bottom line is that there are two main issues you want to consider when choosing: **compatibility and quality**. They are not the same thing.

Compatibility. A compatible CD is any CD that will work with your computer. And, you're not going to get the same results with all brands of CD recordables (CD-Rs). There seems to be very little rhyme or reason to this, but one brand of CD-R or CD-RW may work very well on your machine and others will not. I found no tests or data that will predict this for you. It's apparently just a matter of trial and error.

Quality. The second issue, quality, is a question of how long the CD will last without losing the information burned onto them.

If what you want to do is of a short term nature – a marketing CD, a presentation that will be viewed and thrown away, an X-Ray that will be disposed of once it has been reviewed by a physician - then longevity is not an issue and any brand of CD that is compatible will suffice.

However, if you need to be sure that the data, music or photos you are burning will be around for years, you need to be more concerned about brand quality.

Typical situations where this is the case is where you are archiving accounting data for the IRS, or you have to store evidence in a court case that has to be available for years, or you are sending out a portfolio of your photographs that you want a customer to hold on to. In all these cases, you must have confidence that the CD will endure and perform as expected.

A French magazine in 1999 tested 170 CDs (17 brands, 10 per brand). They found that the results varied all over the lot! In fact, some CDs have been shown to totally lose all the information on them when exposed to sunlight for as little as 2 hours.

So how do you choose?

2) CD-ROMs vs. CD Recordables.

There are two basic types of CD: CD-ROMs and CD Recordables [Recordable (CD-Rs) or Re-Writables (CD-RWs)].

CD-ROMs are typically used for mass-produced products, like music or software that you buy in a store. The "information" on CD-ROMs is molded into them at the time of manufacture. This

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data is permanent and cannot be altered. And, other than common sense, it doesn't need any extensive discussion on how to use and store it.

CD-Rs and CD-RWs, on the other hand, are built differently. They are essentially sandwiches consisting of a dye layer and a metallic reflective layer encased in various plastics.

A very high-power laser "writes", data by "burning" or discoloring the dye layer. Then, when the CD is read by a lower power, reading laser, the burned or darkened areas in the dye, block light from reaching the metallic layer. The non-dark areas allow the light thru.

This light that does hit the metallic layer is then reflected back to a light-detector while the darkened areas block the light. The light-detector then reads the light/no-light pattern as the familiar "ones" and "zeros" that can be understood by your computer.

The dye layer is the most critical, complex and the most expensive element in a CD. The dye layer is applied to the top of the plastic disk, not the bottom as is sometimes thought. The dye layer goes on first and the reflective layer is applied on top of the dye layer.

This dye layer must have a stable shelf life. It must also be able to withstand heat, humidity, and some exposure to sunlight – though it is a good idea to keep such a CD away from sunlight as much as possible.

The dye layer is the most obvious place for a manufacturer to save money. Tests on some CDs have shown the dye to fade and the contrast between the dark/light areas to disappear in as little as 2 hours, when exposed to direct sunlight. It is the UV portion of the spectrum that ruins a disk. Consequently, it is imperative that your CDs be kept out of sunlight!

3) How mailing factors impact your choice of CD...

Mailing CDs is an everyday event. However, it's not easy to mail CDs and make sure they arrive undamaged.

That damage is a function of:

- the brand of CDs you use,
- what kind of mailer you choose and
- how the CDs are processed by the Post Office.

In this section, I will address only the first of these issues, the kind of CD you use. The section on choosing Mailing Media will address the balance of these issues.

The July 2002 Changes...

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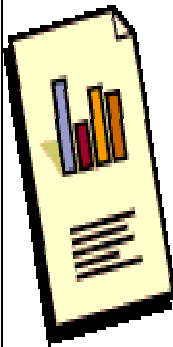
Until July, 2002, this problem of damaged CDs was not widely discussed. Now, however, the problem is “out there” because, with the rate changes that went in effect in July 2002, the Post Office policy on mailing CDs changed as well. Starting with this date, a surcharge can be assessed on CD mailings and this changes the economics of this sort of mailing.

The core of the problem, as far as the US Post Office is concerned, is that most brands of CD are incompatible – ie both too fragile and too rigid -- for the high speed mail sorting machines used by the Post Office to sort letter mail. These machines subject CDs to various stresses that can – and frequently do - result in them arriving damaged or cracked. And it costs the Post Office more to process them when they have to be sorted other than on these high-speed machines.

Because most CDs can't be processed on this high-speed, letter mail sorting equipment, the Post Office, as of July 1, 2002, has sought to classify CDs under the “too rigid” category of the Letter-Size Mail, “Nonmachinable Criteria” in the Domestic Mailing Manual (DMM). They are then subject to the same surcharges as other non-standard letter mail.

What it means to you...

The meaning of this re-classification, for postal customers, is that the economics of a CD mailing have changed, at least a little. A budget for mailing must now take into account the possible Postal Rate surcharge, if they want to mail CDs as *letter mail*.



NOTE On Letter Mail—Letter mail, as related to this surcharge, is any mail that falls within the following specs. – 6-1/8” x 11-1/2” x 1/4” and is 1 oz., or less, for 1st Class Mail; or 3.3 oz., or less, for Standard (or Bulk) Mail. If it is larger than either of the two dimensions or exceeds 1/4” in thickness, or exceeds either of the specified weights, these surcharges do not apply; because any mailing exceeding these specs is subject to the postage according to their weight and the class of service desired. Moreover, these surcharges are intended as incentives for Postal Customers to package CDs to minimize damage to them. And, when CDs are packaged properly, as a rule, they will exceed one or more of these specs.

This is the same surcharge that applies to all letter mail covered by this section of the Domestic Mail Manual. These surcharges are as follows:

FIRST CLASS:

1st class single piece letter, 1 oz. or less = 37¢ + 12¢ (\$120 per thousand), surcharge

1st class pre-sort letter (but not automated pre-sort), 1 oz. Or less = 35.2¢ + 5.5¢ (\$55 per thousand)

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For 1st class, fully automated pre-sort, you will definitely have to check with a Mail Design Analyst at the Post Office.

STANDARD (OR BULK) MAIL:

3.3 oz, or less, letter mail, with no special discounts 26.8¢. + 4¢ per piece (\$40 per thousand).

Non-letter rate is 34.4¢, for a “Flat” or non-letter mail piece that exceeds either one of the maximum standard letter dimension, like a 9 x 12.

Prior to this change, you could mail a CD as letter mail without the surcharge. You just had to be willing to live with the results – which sometimes were a problem and sometimes not.

With the change, you still have to be willing to live with the results; it just costs more. In other words, the surcharge will not increase or decrease the incidence of damaged CDs, when mailed as **letter mail**. So, the only thing that’s changed is the economics of mailing CDs as **letter mail**.

The bottom line is that when you mail CDs you still have to decide which mailer offers the best risk/reward ratio for getting CDs where they are going in good shape. But, this added cost may make some of the non-letter mail choices – such as our Traditional cardboard mailers -- more attractive than they previously were. And, this apparently, was one of the reasons that the Post Office introduced these surcharges –to give mailers an incentive to use better packaging when mailing CDs.

In addition, since not all CDs give these machines a problem, you would probably want to check with a Mail Design Analyst at the Post Office to get a determination, from them, before you make a final decision. You don’t have to take this step, but it’s likely to save you money and/or the annoyance of sending out a mailing and getting it back for additional postage – or, for that matter, paying a surcharge when you don’t have to.

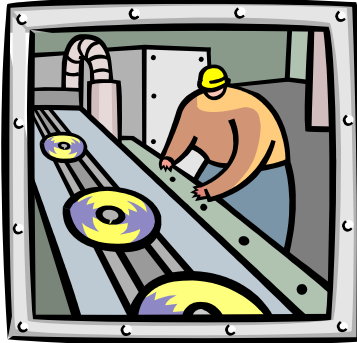
From a practical point of view, if you are doing a large enough mailing, you can be pretty sure the Post Office is likely to assess these new charges – simply because it’s hard to escape notice on large mailings. On the other hand, if you just want to drop one or two CDs in the mail and are not too concerned about possible damage, you may not have to worry about them. They may not be caught.

In the section of this White Paper that discusses Mailing Media, I will address how this change impacts your choice of mailing media. Suffice it to say, for now, that if you are planning to mail CDs, for any purpose, you need to be aware of the circumstances under which these surcharges apply and what they mean to your planning. In brief, you have, basically, to trade off total cost vs. damage to your CDs.

And, in terms of the subject of this section, the thing you might want to do is to seek out a supple, flexible CD that can endure the stresses of the mail sorting machines best. To date, I’ve been unable to find such a CD, but I am told they do exist. And, if they do and you can find one, this is likely to save you paying the surcharge.

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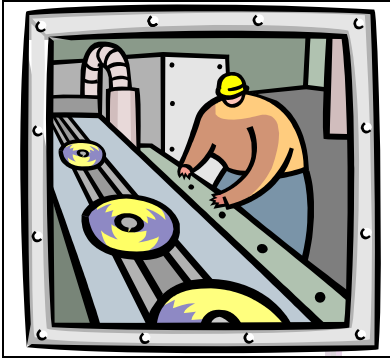
In Conclusion...



be suitable to any archival task.

The success of every CD-Burning project starts with a good CD. And the way to know which will be best is to ask yourself: **how long do I want this data, music or these photos to endure in this form?** If your project does not have to survive for a long period of time, then any CD that will work with your computer will serve your purpose. On the other hand, if you need to be sure it is safe for long term storage, the only CD that seems to have universal acceptance for long-term storage is the Mitsui Archival CDs. They are rated at 400 years and therefore, with proper storage should

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SECTION 2:

HOW TO AVOID BURNING "COASTERS"

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Introduction

As I said in the last section, the performance of any CD is a combination of the disc, the drive that records it and the drive that reads it. Thus, once you find a brand of CD that works well with your computer, you have to start thinking about how you want to burn your information on that CD.

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When starting to research this white paper, I – like most people, apparently - assumed that CDs were easy to create and distribute. What I discovered, however, was that there were a number of pitfalls that could result in a ruined CD, called a “coaster”. It's much easier to create an unusable CD then it seems on the face.

Recordable CDs are amazingly complex--success is not nearly as simple as it seems in burning successful CDs.

Burning a CD is a 4-step process and each step is crucial to insuring the success of creating a successful CD:

1. Defining the contents of the CD to be created.
2. Gathering data on the hard disk data to be burned onto the CD will be pulled from.
3. Creating ISO images (matching the files you need to burn to the CD to their direct names and locations on the CD-R).
4. Copying the ISO images to CD-R.

If any of these steps fail, you will have a coaster. If they all go smoothly and you're able to catch potential glitches before they happen, you should be able to avoid any potential coasters.

1) Importance of a good burner

This first piece of advice is absolutely crucial:

Get a good CD burner! Spend what you have to, but if you get this wrong, it's going to be hard to overcome.

Customers tell me it is not uncommon for some CD burners to ruin MORE THAN HALF the CDs they're supposed to create.

As you can imagine - or may have experienced yourself - this is very time-consuming, frustrating and, ultimately, expensive. From the research we've done, it seems the cheaper the CD burner, the more problems you will experience. In other words, you get what you pay for.

Buffer underrun...

The most common cause of burner problems is buffer underrun. The CD recording process has to be continuous. It can't be interrupted in mid-session. The CD burner must always have something to write, from the moment the session starts until it ends. Therefore, the data-stream from the hard drive to the CD-writer must be continuous.

To support this continuous process the CD-Writer has an internal memory-buffer. This buffer compensates for small data-stream gaps, or interruptions. However, if the process is interrupted for too long, the CD-Writer will run out of data to burn. This will cause gaps in the information

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being burned; or, in the worst case, it will ruin the entire CD-R. In other words, you'll have a coaster.

The cause of buffer underrun is in the nature of Windows. Windows is a multi-tasking system. That means it can run many programs at the same time. The CPU, on the other hand, can only do one thing at a time.

To solve this problem, Windows divides the CPU-time into small slices and gives each running program a short period of time to execute, before the CPU goes to the next program. The more programs you run, the smaller each time-slice gets. If the slices are too small, there may not be enough time for the CD-burning software to fill the buffer on the CD-Writer.

The same is true of the hard drive. It can't read everything at the same time. Therefore, if some antivirus software or a screensaver starts in the middle of your CD-burning session, the hard drive may be busy with these other tasks and stop reading CD-data.

There are two things you can do to overcome this problem.

One, you can get a CD-Writer that has a new feature called "Burnproof". This is now offered by Plextor and a few other manufacturers. This is said to reliably eliminate this problem.

What is Burnproof?

Burnproof is a new technology certain manufacturers are adding to CD writers that stops the burn when it's about to fail, and then restarts the burn when it's clear to burn without errors.

Our customers tell us that a computer with Burnproof-enhanced CD burner can multitask without producing coasters. Some users have told us that they will play computer games, be searching the web, and have 20 or more active programs open while burning a CD with burnproof and they will still be able to produce a perfect CD. They have also told us that when the CD is completed burning, the CD writing program will pop up a message that tells you how many potential failures were prevented.

What to do if you don't have "burnproof"...

If you don't have, or don't want to acquire one of these new "burnproof" models, it is recommended that you keep a "clean" machine. Reboot your computer before you begin a session. This will insure that your operating system is completely stable.

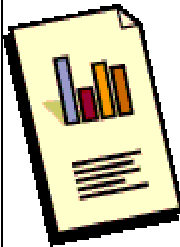
Next, terminate all programs but the CD-burning software. Also, don't use your CD-Writer's maximum burning speed. This way the CPU will only have to send half as much data to keep the buffer full. Keep your mouse movement to a bare minimum. And, finally, only install software on it that you know will not affect your CD writing software or CD burner.

If you want the most efficient use of your CDs, check out 2 shareware programs: FillCD (www.fillcd.com) & Burn To The Rim <http://bttb.sourceforge.net/>

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Both FillCD and Burn To The Rim (BTR) are utilities that quickly help you find the best way to fill your CD completely with files and folders without running into broken files or wasted space. These programs offer several additional features to customize the grouping of files, as well as the size of the medium. These programs do not actually burn your CD for you. They just help you organize your files and get them ready to burn.

If you take these steps, you should have far fewer Coasters!



WHY YOU SHOULD BURN MASTER CDs AT SLOW SPEEDS

— Please note that when you are burning a Master CD (in other words, one that will be used to duplicate CDs), it is highly recommended that you burn this Master CD at the slowest speed possible. The slower the speed at which you burn your Master CD, the less chance of any errors cropping up. This is often the key to making sure other CDs generated directly from the Master will be perfect.

2) You May Need To Try Different CDs.

You won't get the same results with all CD recordables (CD-Rs).

There seems to be very little rhyme or reason, but different CD-Rs work differently on different machines. For some reason, some CD-Rs & CD-RWs will simply not work with your computer or burner. Or, those that work perfectly on your computer will not work properly on your customers' machines.

To the best of our knowledge, this is something that can only be understood and fixed in on a trial-and-error basis. Understandably, more of these "consistency" type errors seem to be reported with the cheaper CDs.



AUDIO PLAYER COMPATIBILITY— Some standard audio CD players will have trouble reading home-burned audio CDs. Unless you have tried to play a home-burned audio CD before or your audio CD player specifically states that it can work with CD-Rs or CD-ReWritables (CD-RWs), you may have difficulty with this issue.



BACKING UP NETWORK FILES— If you would like to make a CD backup of files on your company's network, make sure to copy these files to a hard drive on the machine where the CD burner is installed. Otherwise, the transfer rate of copying from the network to a CD as it burns may cause you to burn a coaster and may slow the network down for other users.

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CD BURN-RATE CAUTION — Don't assume you can burn at the top-rated speed of your CD-R drive (e.g. 24x) even if you have a fast computer and a fast hard drive. 4x is safe, and 8x if you're lucky.

A Few Quick Tips...



- (1) Make sure your hard drive that has been defragmented recently.
- (2) Disconnect your computer temporarily from the network.
- (3) Don't have your computer doing ANYTHING else while burning



WHY IT'S IMPORTANT TO BURN CDs AT THE RIGHT SPEED

— Make sure to burn CD's **at the proper speed**. With music CDs especially, slower is recommended to insure a successful burn.



ONE PROBLEM WITH THE NEW 700MB CDs —During our research, a number of our customers told us their older CD-Recorders had trouble making the shift from the older 650 MB CD recordables to the newer 700 MB CD recordables.



WHY YOU MUST HAVE CLEAN CDs TO GET THE BEST RESULTS

— Make sure your CDs are clean! From what our customers have told us, the occasional smudge (or fingerprint) on the burned side of a disk can make it impossible to read on a PowerBook. A smudge can also block the recording laser. If this happens, you will have gaps in the information you wanted to put on the CD. You can avoid this by using a lens cleaning tissue, such as the one we offer on our website to eliminate any smudges safely and insure a proper read.

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WHY YOU ABSOLUTELY, POSITIVELY MUST KEEP YOUR CDs OUT OF SUNLIGHT! — Don't leave your CDs laying around unprotected. And, especially don't leave them anywhere the sun can get at them. Some disks can be completely destroyed in as little as 2 hours exposure to the sun.

3) MAC/ PCs Compatibility

One of the most important things to keep in mind when creating a CD is whether the end user(s) will be all PC people, all MAC people, or a combination of both. You want to prepare your CD so it is readable by whichever machine the intended user base will have.

If your end user(s) have only MACs or PCs, the problem is relatively simple. But, where you have to produce a CD that will be run on both machines, the simplest thing to do sometimes is to create a version for each machine.

You can also create a universal, or hybrid version. In that case, it appears that a CD made on a MAC, with appropriate coding, will almost always run on a PC. But, the reverse is not always assured.

One recommended solution is to burn all CDs using the **ISO 9660 format**. ISO 9660 allows a CD-R disc to be accessed by practically every other computer platform, no matter which computer it was recorded on. For this reason, ISO 9660 is the universal standard file format for CD-Rs. All CD-R software includes an ISO 9660.

ISO 9660 is basic and it usually will work with both MACs and PCs.

There is a limitation, however. File names can only be 8 characters long. This may not sound like a big problem. But, when you have 25, 50 or 100 files that you have to re-name with only 8 characters, it can be a time-consuming chore. In some cases, therefore, it may be more cost-effective to just produce one version for the MAC and another for the PC.

4) Avoiding Incompatibilities For CDs and Their Contents

Using PDFs. One way to insure cross-platform compatibility for a document that you would burn to a CD is to create it as a PDF (Portable Document Format) with Adobe Acrobat.

A PDF seems to be the universal answer for all users. It insures they can view your documents correctly. PDFs eliminate the MAC-to-PC problem and also eliminate most same-platform incompatibilities as well.

Even where you are not concerned about compatibility, you may want to burn crucial documents as PDFs. One of the advantages of a PDF is that the document will appear on someone else's computer exactly as you created it. This way, everyone you send it to, gets the same thing.

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There are two important caveats, however.

First, if any portion of the document you're creating calls for typefaces other than the Acrobat default fonts, you have to use the "Distiller" feature of Acrobat to include those fonts when you burn the CD. If you don't include them, when your document is read by the receiving computer, everything will print out in one of the default typefaces. This would defeat one of the purposes of using a PDF – namely to create a uniform look across platforms and computers.

Second, not everyone has Acrobat Reader. It is, therefore, a good idea to include Acrobat reader on your CD. This will make it easier for everyone to open your PDF. Alternatively, you can put a link to Adobe's website, <http://www.adobe.com>, and the Adobe Acrobat Reader can be downloaded from there. Obviously, though, if you include the reader, it will be easier for someone to read what you have sent them.

Incompatibilities. Disks written using CD-RW (re-writable) media may not be readable on a drive model different from the one on which it was created, (i.e. Disks written on a TEAC might not read properly on a Que!). Also, CD-RW disks are usually not readable on audio CD players, unless explicitly stated.

Older CD-Rom Drives. Even after you've done all the above, keep in mind that some older CD-ROM drives may not be able to read some burned media. There does not appear to be a cure for this – at least not one that we've come up with.

5) Making it easy for someone to use the CDs you send out

When you are sending out something on a CD, it is a good idea to "walk in the other person's shoes".

As a practical matter, this means if you use Microsoft PowerPoint to send out a presentation, make sure to include PowerPoint Viewer software on the CD. If you don't, chances are a portion of your audience will not be able to open what you've sent them and will not take the time to figure out why it isn't working.

Similarly, if you are sending out a Microsoft Access database, it is a good idea to include run-time versions of Access so that the person you send it to can open and run it without a hassle.

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HOW TO MAKE CHANGES TO A CD-R FILE YOU'VE COPIED TO YOUR HARD DRIVE

— When a file is written to a CD-R from your hard drive, it is marked as "read only". If you want to go back and modify this file, in any fashion after your CD has been created, you will need to copy this file to your hard drive and change it over from a READ ONLY.

To change a file's property from read-only, you first have to go into Windows Explorer, find the file, copy it from the CD-R to your hard drive and right click on it. Then, click on properties and uncheck the "Read Only" box. **[Please note these are directions for the PC only.]**

6) Providing How-To-Use Instructions

Another area where it helps to "walk in someone else's shoes" is in the matter of instructions. Most people put a CD in their drive and expect automatic action. If nothing happens, they may check it with Explorer. But 9 times out of 10 they won't know where to begin.

There are several things you can do to solve this. First, put only one file in the root directory of the CD: "**instructions.txt**". This tells them what is on the CD, what to do with the CD and gives any additional information you need them to know.

Second, it's a good idea to make sure you add an **autorun.exe**. This works wonders if put in the root directory. Autorun.exe will enable customers to have a program automatically pop up when the CD is inserted into the customer's CD-ROM Drive.

Without this, you will find that many people are unable to access the information stored on the disk. Even some supposedly computer-savvy people, apparently, have been unsure what to do once they inserted the disk.

Third, it's a good practice when you send out a data CD to make sure to tell the person you're sending it to that this is a **DATA CD**.

Customers have told me that this simple step will eliminate someone calling you, frantically, saying, "there's nothing on the disk". In other words, more than one customer has told me that some portion of every audience you send a CD to will automatically assume that it is a music CD and attempt to play it on an Audio CD player.

When one person calls you with this problem, it's easy to solve. But, if one person calls, how many are making the same mistake? It's better to assume there will be a problem and head it off.

7) Verify

This is so important, yet it is one area of advice that is neglected. One of the most important things you want to, after burning a CD, is to verify that you've copied everything you want onto

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your CD. You don't want to assume that all data is OK just because the software and hardware completed the process.

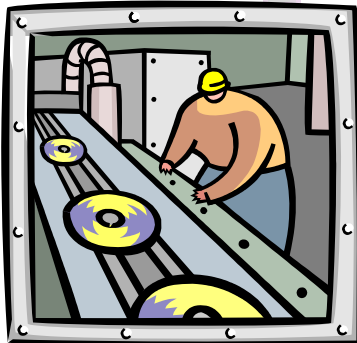
Test the CD out several times. We recommend removing the recently burned CD from your CD-R drive and putting into another computer's CD drive. Then, verify the contents. You can also try rebooting your computer and re-verifying the contents after you've rebooted.

You can test the CD-R in your other CD drive (one that is NOT the CD-burner drive). If you can see/read/listen to whatever you wanted burned on that CD drive then you can assume everything is really "a-ok". It takes 5 minutes to test a CD this way but it's better than figuring out your CD data backup of the company's financial assets is really a CD-coaster.

Some of our customers recommended, as an additional step, that you actually run the entire CD to verify the CD is complete. Others recommend that, as an additional insurance, before duplicating a CD, always send it a test run to an end-user to see if it does what you want it to.

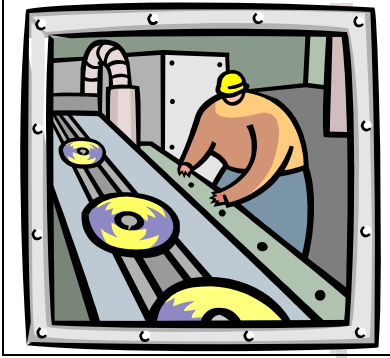
This recommendation is especially important if you are burning a master and then using it to burn additional copies. Error rates vary widely, for all sorts of different reasons. But, the bottom line is you want to make sure you are not embarrassed by what you send out.

In Conclusion...



A coaster is any unusable CD. Burning a good CD starts with using a good burner or making sure that everything else is turned off and you've re-booted your computer. In addition, you want to make sure that any CD you send out has everything your recipient needs to open it and use it easily.

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SECTION 3:

HOW IMPROPER LABELING CAN DESTROY A CD

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Introduction

Once you have a brand of CD that will serve your purposes and it is working with your computer, you will need to label your CD. As with the other areas we have been talking about, it is not as simple as it seems.

The most popular labeling solutions are shown in the accompanying chart. As you can see from the chart, there are 5 factors to consider when labeling a CD. They are:

Immediate or archival use. As with almost every aspect of CDs, time-purpose has a decisive influence on choices. CDs that are for immediate or one-time only use, can use practically any type of labeling because, with the exception of a ball point pen which must never be used, none of them is likely to damage a CD, in the short term.

On the other hand, for a CD that is to archive data, music or photos over a long period of time, there are fewer safe choices. You have to choose something that will work for years. There is no margin for error since the originals will have been destroyed by the time you come to try and open the CD.

For long-term storage, therefore, only Tyvek Sleeves, DVD Cases and Jewel Cases are recommended. The details of the various comparison factors are shown on the chart for these storage solutions, at the end of that section of this white paper.

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Identification. The first job of a labeling system is to identify what's on the disc. This is true for every purpose that a CD might be used for.

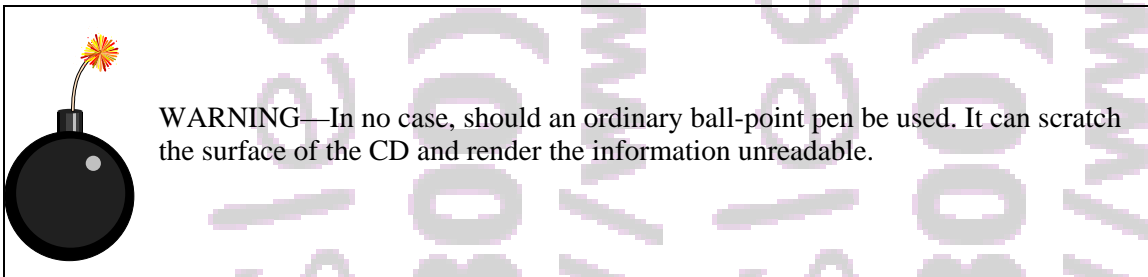
Cost. Each of the labeling solutions has a different cost attached to it for (a)materials, (b)printing and (c)applying (labor).

For example, paper labels are cheap. But, applying them is somewhat labor intensive. On the other hand, some CD printers – the ink jet printer, for example - are expensive, but they apply your information cheaply.

Cost is also heavily dependant on the number of CDs you need to label. When you are doing a large volume of CDs at one time (vs. just one or a few) you have more choices. A project's budget and size of program, therefore, will be a major factor in the choice of your labeling solution.

Benign and Permanent. Any method of identifying the contents of a CD must be benign so that it doesn't damage the CD. This is more difficult to accomplish than it might seem at first. For example, many paper labels have adhesives that can eat into the CD over time and destroy them. The adhesives will actually delaminate the disc. Likewise, some inks used in certain brands of markers can have the same effect.

As noted in the accompanying chart, after reviewing all the competing claims, it seems the most conservative thing to use for archival CDs is also the cheapest: a TDK CD pen. It is the most benign. The inks are said to be formulated specifically for use on CDs. Moreover, the writing point will not scratch the CD's surface. Thermal printers seem to be equally safe. Their inks are formulated for the purpose and the images they apply appear to be permanent.



However, any labeling solution chosen, either for long or for short-term, must be permanent. For example, if you put a paper label on a CD and it comes off, there is no question you will have problems. It might damage the laser drive that reads the CD. Moreover, the obvious reason the labeling solution must be permanent is so that you can know what's in a particular CD whenever you want to access the data, music or photos you've stored there.

Graphics. The purpose of CD label graphics is to make it stand out so it gets noticed. This typically occurs in marketing situations where the CD has to compete for the attention of a

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particular audience. The graphics are designed, therefore, to have an impact, to get the attention of the recipient.



NOTE—For CDs designed for a short term purpose, cost and graphics are likely to be the principal trade-offs. Generally, there is little danger of delamination, for example.

1) Here's how these factors apply to the various competing CD labeling choices.

- (1) You can label it.
- (2) You can ink jet it.
- (3) You can thermal print it.
- (4) You can write on it.
- (5) You can silk screen it.
- (6) You can print directly on new printable CDs

There are pluses and minuses to each of these methods. I'll take these one at a time.

Paper Labels. Paper labels are cheap. They offer vivid graphics. You can print them with practically any graphics your PC Printer is capable of.

The problem with paper labels is twofold. First, they are somewhat tricky to apply. Second, they are suitable only for short runs.

The tricky part is that paper labels must be precisely applied to the CD. An applicator is needed. There are several of these on the market.

It was not the purpose of this paper to evaluate the different brands of applicators. However, there are some general guidelines to offer.

The job of the applicator is to make sure the labels are (a) absolutely centered on the CD and (b) applied flat, with no air bubbles. If a label is off-center, it will degrade the ability of the CD Reader to read the disc. In some cases, if the label is really off-center, it can even damage the CD Reader by creating wobble. When something is spinning at 3600 rpm, wobble can create a lot of stresses that, ultimately, will cause damage.

In addition to being properly centered, there must be no air bubbles in the surface of the envelopes. Bubbles cause problems for many CD Readers. For instance, in certain readers, they can cause a CD to jam. This means you would have to replace the Reader. Obviously, if you are sending a CD to your boss or to a client, this is something you don't want to have happen.

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Labels. For the most part labels are not suitable for CDs that are part of archival or other long-term projects. The adhesives in the labels have been shown to attack the CDs over time and to cause de-lamination. Some manufacturers offer labels with water-based adhesive backing; but, so far I have not seen any study that shows how well these will endure over the long haul. Therefore, it's probably best to consider labels for short-term projects only.



NOTE—Paper labels are not suitable for slot loading readers. Car stereos and some MACs are examples of devices that have these kinds of readers. They can cause jams.

Ink Jet Printers. This is the same technology used in PC ink jet printers. Ink jet printing allows you to print 4-color art. The images are muted. They are not vivid. However, they are easy to apply and acceptable for many projects. One machine that is out on the market will quickly print one CD at a time and is ideal for many small volume projects. In addition, once you have paid for the machine, this is a relatively low cost way to apply graphics to a CD.

The main drawback to ink jet printers is that the images they apply to CDs are easily smudged. A moist finger is all it takes. Since ink jet images are not permanent, they are probably not suitable for long term projects where a CD might be subject to a lot of handling. Every time it has to be taken out and returned to storage, it could be subject to smudging.

The bottom line is that ink jet printing is suitable for an inexpensive, moderate-size burn, like a marketing presentation. But, it is not a foolproof labeling solution for something that is to be archived over many years. It is too easy for the information it prints to be erased or damaged.

In addition, some of the literature suggests that, if you want to consider ink jet printing for an archive-able CD, you have to make sure the inks you use will be benign and will not damage the CD over time.

All in all, it seems to make sense to just use Ink Jet Printing for something that has an immediate, or one-time, or throw-away function.

Thermal Printing. Thermal printers appear to offer an attractive combination of graphics and benign ink, according to the current literature. They can print up to 4 color art. They are considered archival-safe. And, though the images can be chipped off, that seems to be such a remote possibility that the images copied onto the CDs are considered permanent.

The only drawback to Thermal Printers seems to be that they are expensive – more than ink jet printers, for example. Therefore, they are probably more suitable for a facility where substantial rather than small runs are common.

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Sharpies. These have soft tips so they are not likely to cut thru the surface of a CD, or to apply too much pressure. The problem with Sharpies is their ink. Some people writing about them seem to think they are likely to be ok for the short term; but worry about using them for CDs that are for long term projects. This concern centers on the ink in a Sharpie. It contains alcohol and it is suggested that the alcohol might damage a CD over time. Therefore, it is considered prudent not to use a Sharpie to write on any CD that is intended for long term storage of any information.

TDK CD Marker. TDK's CD Markers seem to be the one thing that has the confidence of most people I talked to. They have a soft tip so they won't gouge the surface of a CD. And, the inks appear to be formulated to be benign over time.




For all of these reasons, we've marked TDK's CD Marker as the best buy, on our chart, if you want to be able to casually write on a CD. It looks to us like a best buy because, in addition to being benign and permanent, it is cheap! They probably are not suitable for those situations where graphics are a consideration. But, they should be ok for both long and short term CD projects where a simple notation will suffice.

Printable CDs. These are relatively new and can be printed on your computer's printer. Most of these CDs seem to offer a good surface for printing. However, since each manufacturer has something of a different formula, it was outside the scope of this paper to test each brand of offer an insight. But, with the information offered here, you should be able to ask good questions of the CD manufacturer or distributor.

Silk Screening. Silk screening offers good graphics and the images are regarded as permanent. The only drawback, apparently, is that you need to be burning a fairly large run of CDs before you can use Silk Screening. There doesn't seem to be any device that will let you silk screen short runs.

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Comparison Chart – How to Label a CD

Addressing Method	Cost	Recommended For...	Archival Use	Graphics	Downside To Use	Labor Factor
Paper Labels 	Labels are cheap but must be applied by hand. Requires an applicator to do properly.	Any CD where low cost and good graphics are sought.	Not recommended Adhesives can - over time - eat into the CD and destroy.	Usually very high quality depending on art & printer. Can accommodate up to 4 colors.	Must be applied with labeler. Hand application can result in "off center" application. Also, can give problems when used in "slot loading" CD Reader	High. Not for high volume situations. Best for small runs.
Ink Jet Printers 	Depends. Initial investment \$400 & Up. Ink cartridges are typically cheap.	Mostly short runs.	Generally not recommended for archival situations because even a sweaty finger can smear it.	Up to 4 colors, depending on which printer used. But, the final product lacks "bounce" or vividness.	Smears so easily that essential information might be wiped out.	Varies with printer, but generally not intense
Thermal Printers 	Initial cost of Printer relatively high; but cheap to use	Because of cost, probably only good for situations where there is a constant need for labeling a quantity of CDs	Said to be appropriate for CDs intended for long-term storage	Up to 4-color printing.	Said to be possible to chip printing with use	Varies with each printer but probably not a big deal

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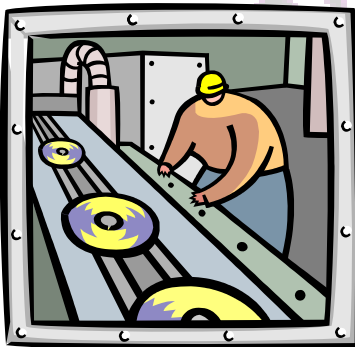
Comparison Chart – How to Label a CD (Continued)

Addressing Method	Cost	Recommended For...	Archival Use	Graphics	Downside To Use	Labor Factor
Sharpie Pen 	Low cost	Recommended by some. However alcohol in ink worries others. TDK CD Markers are said to be safer choice.				
TDK CD Marker, or equivalent 	\$2.95/each Best Buy!	Any application	Designed for this purpose.	Handwriting for the most part. The same limitations as any other pen	None we've been able to find so far.	

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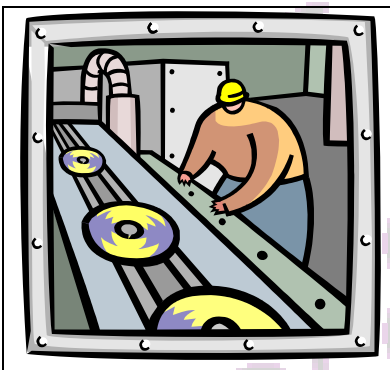
Warning: never use a ballpoint pen on a CD--it will ruin the CD

In Conclusion...



Once again, the time over which CDs must endure dictates which of the labeling options is best for your project.

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SECTION 4:

HOW CHOOSING THE WRONG MAILING MEDIA CAN KILL THE BEST LAID PLANS.

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Introduction

There are 4 things to consider when choosing CD mailing media:

- **Level Of Protection Desired.** CDs frequently are damaged in the mail and the amount of risk you are comfortable with will be a big factor in your choice of CD-Mailer.
- **Stresses On Your CD From Mail Processing.** Depending on how your CD is sorted and processed by the Post Office, it can be subjected to stresses that can deliver broken CDs to your audience. Since that is obviously undesirable, you want to consider mailing CDs in ways that will insure, as far as possible that they reach their target audience intact.
- **Graphics Choices.** Once you have settled on the CD-Mailer you think offers you the best cost/protection ratio, you will have, at the same time, defined the range of graphics available.
- **Cost.** The cost considerations include both the basic cost of the CD-Mailer, graphics and the postage consequences of using that particular mailer.

The charts that follow this section offer you a quick way to compare how the different mailing products stack up in each of these categories. Note that while we have made every effort to convey the latest information to you, you should probably check with a Mail Design Analyst at the Post Office to make sure you are working with the latest changes in this area, as they were still in some flux when this was written.

Here are some of the factors driving these charts...

1) How to Protect Your CDs In The Mail

When you mail CDs, you want them to arrive in good shape. You don't want the embarrassment, expense and bother of having to send out a bunch of duplicates to everyone who calls to tell you their copy arrived cracked or damaged. Even worse – you don't want to wonder how many of your CDs arrived damaged and no one called to tell you!

Therefore you need to protect CDs in the mail. How much protection and at what cost become the key issues.

The problem is that CDs are rather easily damaged by a trip thru the Post Office. The main culprit is their OCR (Optical Character Readers). These are the high speed Letter-Mail Reader/Sorters that are the backbone of Postal Operations. The problem with OCRs is that they race mail thru a lot a hairpin turns. At high speeds, these turns exert forces on CDs that can crack them. And, obviously, a cracked or broken CD is a useless CD. Therefore, you want

...to protect your CDs in the mail

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The first thing you can do to protect CDs you mail is to put the CD in a mailer that's strong enough to make sure this doesn't happen. The tradeoff, however, is that the mailers that offer the best protection cost more than some of the other mailers & envelopes you could choose. In addition, because they weigh more, they can raise the cost of postage.

2) How To Minimize CD Mailing-Related Damage and Keep Costs Down...

CD damage during mail sorting is a fact of life, in the US mail system and in mail systems of other countries. This is the case, even though many postal customers are not aware of this problem.

However, now that the US Post Office, as of July 2002, has imposed surcharges on CDs that are mailed as letter mail, this problem is "out there" and is one of the factors that must be considered in choosing a CD-Mailer. The problem with this surcharge is that it doesn't buy you any better processing of your CD. It's just the Post Office's way of offsetting what they regard as the higher costs of processing CDs.

However, whatever the risk of damage was before this surcharge went into effect in July of 2002, it is still there. And, the reason is the same, namely, that the Post Office will still try to process as much letter mail as it can on these high speed mail sorting machines.

Overall, CD mailing-related damage is a function of:

- How the CD is processed by the Post Office
- The type of CD-Mailer used
- The Brand of CD.

It's crucial that before a mailing goes out, that the person responsible for mailing the CDs understands...

How the CD is Processed By The Post Office:

The issue of which Brand of CD will survive best in the mail aside, the best way to insure that your CDs arrive in good shape is to try and get them "Manual Handling". Basically, what this means is that you do not want to have them processed on the High Speed Letter Processing Optical Scanner/Sorters.

The problem is, however, apparently that there is no sure way to get this. Even when you pay the new surcharges and mark you mail for Manual Sorting (as discussed below), there is no guarantee that your mail will in fact be kept off these high-speed machines. The Post Office at point of entry might agree to do it and, might, in fact do it. But, that doesn't mean, apparently, that every Post Office along the line, will manually sort your mail.

On the other hand, I've had a number of customers who report to me that using this "Manual Only" or "Hand Cancel Only" endorsement on their mailings seems to have worked. So, the best I can do, is what I've done. I've quoted the official line to you –namely that there are not

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guarantees – then, at the same time, I've shared with you such experiences as our customers have shared with us.

Influence of the Type of Mailer on Your CD Mailing

The mailer you choose will have a large influence on the success of any CD mailing. That's because the Mailer's size, shape and weight pretty much determine whether it is letter mail, or one of the other Postal categories of mail. And, further, the surcharge will only apply on either 1st Class or Standard (Bulk) mail, as described below...

Here's how to determine whether the mailers you're using are letter mail or not.

Letter mail is defined as:

Any mail that falls within the following specs. –

For First Class Mail, Letter Mail is...

- Anything Smaller Than 6-1/8" x 11-1/2" x 1/4"
- Under 1 oz.

For Standard (Bulk) Mail, Letter Mail is...

- Anything Smaller Than 6-1/8" x 11-1/2" x 1/4"
- Under 3.3 oz. for Standard (or Bulk) Mail.

If your mailing falls outside this definition, then an extra **NON-STANDARD MAIL surcharge** will apply – no matter what you are mailing. What is new, is that The Post Office will assess this same surcharge on CDs that fit these STANDARD LETTER MAIL criteria. However, if your mailing does not qualify as letter mail, the cost to mail it is, of course, largely determined by the overall weight of the piece. The surcharge is for letter mail CDs that are too rigid and might be damaged in transit thru the Postal System.

What are the surcharges? Here is a complete guide to how much both types of delivery options will cost?

FIRST CLASS:

1st class single piece letter, 1 oz. or less = 37¢

Surcharge = 12¢ (\$120 per thousand)

1st class pre-sort letter (but not automated pre-sort), 1 oz. Or less = 35.2¢ + 5.5¢ (\$55 per thousand)

For 1st class, fully automated pre-sort letter, you will definitely have to check with a Mail Design Analyst at the Post Office.

STANDARD (OR BULK) MAIL:

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3.3 oz more than letter 26.8¢.

Surcharge = 4¢ per piece (\$40 per thousand)

Non-letter rate is 34.4¢, for a “Flat” non-letter mail piece that exceeds either one of the maximum standard letter dimension, like a 9 x12.

To some extent, these surcharges are an attempt by the Post Office to add incentives to Postal Customers to encourage you to choose damage-limiting CD-Mailers when sending out CDs. Strong, rigid CD-Mailers, like our [Traditional Kraft Mailers](#), will not be processed thru the Letter Mail Sorting Equipment. That and the fact that they are strong and rigid means that CDs mailed in these Mailers will do well in the mail. In fact, I had one customer tell me that he had mailed 22,000 CDs to 140 countries using these mailers and had never had a complaint.

The bottom line is these CD-Mailers will be heavier and cost more to mail, but they will reduce instances of CDs being damaged in transit thru the US Post Office and the Postal Systems of other countries.

If you do end up paying a surcharge because of your choice of mailing media, it's crucial you add this following endorsement to the appropriate line in the address field.

MANUAL ONLY.

Though this endorsement will not guarantee that your CDs will never be processed thru letter mail sorting equipment (where most of the stress on CDs originates), it does increase the likelihood that it will be Manually Sorted, at least for a good part of its trip thru the Post Office. I have also been told by customers that delivering the mail personally to your local Post Office helps; I just haven't been able to confirm that.

One quick tip to minimize damage to CDs in the mail is to make sure they are held in place at the right-hand side (the leading edge of the envelope, looking at the address side of the envelope). When they are so positioned, the CD goes thru the mail sorting equipment first and this has at least some tendency to reduce the stress on the CD itself. I'm told that in some cases, this alone may be enough to get your mail qualified for processing without a surcharge. But, as with a lot of things that are associated with these new surcharges, you will probably want to check with a Post Office Mail Design Analyst, to make sure this information is still current.

If you have any further questions, you should talk to someone in [Mailing Requirements](#) at your local Post Office to see what you have to do to qualify for these rates - because the basic idea behind the reductions in postage is work-share.

How This Relates To Specific Product Choice (i.e. What We Recommend)...

The bottom line is that, typically, the lower the cost of an envelope or mailing media, the less protection it offers. Therefore, the first thing you want to decide is how important it is for all of your CDS to arrive in excellent shape and what are the recommendations of one of the Mail Design Analysts at the Post Office.

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If you must have 100% arrive in good shape, however, then you have to use one of our really strong and rigid mailers, like our [Traditional Kraft Mailers](#) or [Sure-Seal Board Mailers](#). Therefore, if that's what you need, this would be the right mailing media for your CD.

On the other hand, the drawback to these mailers is their cost. They cost more than some of the lightweight mailers. And, because they are much heavier, they cost more to mail. This is true even for a single piece dropped in the mail.

A Few Additional Thoughts On The Subject...

Of course, you can take your chances and mail a CD without any special protection. Just place it in a standard, stationery style envelope and mail it off. Under this set of circumstances, it may arrive fine. However, it may not. It all depends on how well it survives the stresses created as it is processed thru the Post Office's mailing machines.

As noted in the section of this White Paper dealing with your choice of a good CD, one way to improve the odds on your CDs arriving at its destination with minimal or no damage, is to find a brand of CD that is flexible. Apparently, some brands are quite flexible. Most are quite rigid.

CDs that are flexible can be bent and stressed a bit before they are damaged. The more flexible the CD, the more "give" it will have as it is transported thru the Post Office. The more "give" it has, the less likely it is that it will be cracked or strained in transit.

3) A Further Breakdown Of The Choice Of Mailer

Each of the following products offers a different range of graphics. Typically, there is a "bare bones" option – simple copy, type only - and then more elaborate 4-color graphics.

The main thing is: they will deliver your CD in good shape. The several charts at the back of this Section, offer you The most prominent are the

(a) Sure Seal Mailers:

If it's important for you to be completely certain that all copies of a particular CDs you mail will arrive in good shape, you will want to mail them in one of our hard cardboard mailers, such as the Sure Seal Mailers. These mailers have an excellent record of surviving not only the US Postal Service, but the postal systems of other countries, as well.

One of our customers told us that before he started using these mailers, he would routinely get a flood of complaints every time he sent out a mailing.

As noted above, the tradeoff is that while these mailers can save you the cost of re-doing and re-mailing damaged CDs, they are not as cheap as some of our lighter, less sturdy mailers. In addition, because these mailers weigh more than some of our lighter mailers, the postage for the

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[Sure Seal Mailers](#) is more than it is for the lighter ones. Moreover, your choice of graphics could be than with other of our products.



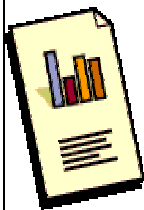
NOTE—The [Sure Seal Mailers](#) and the [White Traditional Mailers](#) are made of the same strong board. The difference is that Sure Seal Mailers have a Peel & Seal style closure.

The [Brown Kraft Traditional Mailers](#), on the other hand, have a tuck-in flap, instead of a Peel & Seal closure. They are made of a slightly stronger board and offer somewhat the greater protection. It just a matter of which closure you prefer and how strong you want your envelope to be.

(b) [CD Wallets](#). [CD Wallets](#) are a book-like storage/mailling product. Because they are fabricated from strong board and because of the book-like construction, wallets offer outstanding CD protection in the mail.

When a [CD Wallet](#) is opened, the right hand side will have a pocket for the CD and as well as space for some literature behind the pocket. You slip the CD into a half-moon shaped cutout. The half-moon shape of this pocket lets you see the label on the CD as soon as the wallet is opened. Behind the CD, on the same side, is a pocket where you can tuck in some literature.

The left hand side of the wallet can be printed with an advertising message. In fact, since these are relatively expensive products, their main attraction is the impact that can be achieved with them. In all, there are 4 panels which can be printed in up to 4 colors to make a very attractive and effective presentation.



NOTE—The [CD Wallet](#) and the [Demo Disc Mailers](#) are often confused with one another. The [CD Wallet](#) folds down to 6-1/4 x 6-1/4 and is somewhat larger than the [Demo Disc Mailer](#). However, both mailers deliver your CD to its destination in excellent shape. They also offer comparable printing choices and great impact.

Finally, while the [Demo Disc Mailer](#) is slightly smaller, it is also slightly less money than the [CD Wallet](#). The [Demo Disc Mailer](#) just has a pocket for the CD. No room is provided for the literature.

Either one, however, is suitable for protecting you CDs either during mailing or while stored for moderate periods of time.

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(c) [Compact Case Mailers](#). [Jewel cases](#) are generally not recommended for most mailings. [Jewel cases](#) are made of a brittle plastic and customers tell us all the time that a large percent of their [jewel cases](#) break in transit. The cause of this is the brittle plastic the cases are made of.

One thing that improves the survival of [Jewel Cases](#) thru the mails is our [Compact Case Mailers](#). They give an additional measure of protection. In fact, of all the orders of these mailers that we've sold, we've never had anyone call back and tell us that the mailers didn't work satisfactorily. Finally, these can be printed in up to 4 colors. Therefore, they offer both good protection and the possibility of good impact.

It is also true that substitute [Jewel Cases](#), such as the [C-Shell](#), [Slim Line](#) and Ultra-Slim Jewel Cases, appear to survive the mailing process somewhat better than standard jewel cases.

In the case of the [C-Shell cases](#), they do better because they are made of a lighter, more flexible plastic. In fact, some customers have told me that they've put a label and postage on [C-Shells](#) and mailed them without incident. One drawback to the [C-Shells](#), however, is that they do not provide a space for you to tuck in some literature.

[Slim Lines](#) and Ultra-Slims, on the other hand, are still made of basically the same brittle plastic as the standard [Jewel Cases](#). Thus, when using them for mailing, it is a good idea to use a one of our [6 x 6-3/8 Sure Seal Mailers](#) to protect them in the mails.

(d) [Bubble-lined](#). There are two kinds of bubble-lined envelopes. There is a basic, industrial version. This has the familiar Brown Kraft Paper on the outside. But, there is also a version with Mylar on the outside. The [Mylar Bubble-lined mailers](#) are used primarily where more than ordinary impact is desired.

Both the Paper and [Mylar Bubble-Lined Envelopes](#) are often used for mailing jewel cases. While they will not offer much protection from lateral stress of the type OCRs (Optical Character Readers) produce, they almost always seem to be hand-cancelled. Since that seems to be a key to their successful use, it might be a good idea [to mark them Hand Cancel](#) to be sure.

One caveat: if you are planning to ship CDs via UPS, a bubble-lined mailer is probably a poor choice. The problem is that UPS's system employs conveyor belts that are known to rip up paper envelopes and bubble-lined envelopes are still basically paper envelopes.

Since [bubble-lined mailers](#) are relatively light weight, postage on them is not as expensive as other mailing media. And, finally, graphics on a [bubble-lined envelope](#), where available, is usually quite basic.

(e) [DVD Cases](#). [DVD cases](#) are familiar to anyone who has rented or bought a DVD. They are also familiar because this is one of the cases used by AOL to mail out their offer all over the US. Because there are 2 sides to a [DVD case](#), one side can be used to mount the CD. The other side can be used for literature.

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In addition, [DVD cases](#) have a see-thru plastic layer or overlay around the entire outside. This is called an “entrapment” and it offers you a way to put an insert in the case. Typically, this is 4-color art and is used to get maximum impact for the package.

Even though these cases are primarily for use with DVDs, I’ve had many customers who’ve used them to send out CDs. [DVD cases](#) offer excellent protection. They can easily be mailed – though, because of the weight of a [DVD case](#) - the cost of postage is probably higher than for other mailing media.

Now, if you don’t have to have this level of protection, you might want to consider...

4) Lesser Protection Options

(a) Mail Saver Envelopes:

Mail Saver Envelopes are made a very much lighter board than the Traditional & Sure-Seal Mailers. Therefore, they do not offer you the same level of protection. They have a flap and a Peel & Seal type closure.

You can use a Mail Saver Envelope to send out a single CD + a sheet of 8-1/2 x 11 sheet of paper folded to fit in this roughly 5 x 5 space. A CD & a sheet of paper in this envelope will weigh slightly under an ounce. That means you can mail this for the cost of a single ounce of postage - and since postage typically is a greater part of the expense of mailing CDs, these are attractive alternates to Sure Seal Mailers.

There is one caveat, however. The material used to make these envelopes does not offer much protection against the kinds of stresses created as CDs are processed by the Post Office. In general, these light weight mailers are more suitable for “bulk” mail, as that class of mail is apparently handled differently than first class mail.

Moreover, it is critical to check with the Post Office. There are new regulations coming out of the Post Office for mailing CDs. At the time we were going to press with this white paper, we were still waiting for definitive answers. As they become available, we will pass them along.

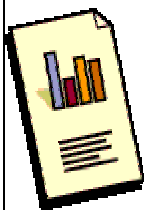
Finally, since you have no control over or, insight into how mail systems outside the US handle CDs, it is probably best not to use this for overseas mailings.

These are the two main CD mailers. However, there are also...

(b) [Economy CD Sleeves](#). [Economy CD Sleeves](#) are frequently used for mailings even though they were designed for short to medium term storage, or as a simple packaging sleeve.

Because they are “flush cut” (ie they have no flap) when used for mailing, the Post Office requires you to seal them with a sticker across the top. This will make sure the CD stays in the sleeve as it goes thru the mail.

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NOTE—Stickers add an additional cost to the overall the use of these Envelopes in two ways. First there is the cost of the sticker and then the cost to apply them. Based on customer comments, however, these costs do not appear to be significant.

Further, since these sleeves are made a light board, they too should probably be used only for “bulk” mail. And, they too may be subject to new Post Office rules which have not been communicated to us at press time.

Now, in contrast to some of the other mailing media, one advantage to using the [Original CD Sleeve](#) is that they offer [4-color graphics at a very low price](#). For example, we do a very long run of these sleeves every other week. Because we run other customer orders with this long run, the price of this product is very low. In fact, we had a famous museum in Connecticut that sent out their announcement of an exhibition in a [4-color Economy CD Sleeve](#). Of course, it had to be manually cancelled, but it was a very low cost way to get outstanding impact.

Somewhat akin to Economy Sleeves are

(c) **Light Weight CD Mailers With Window.** These Mailers are made of the same .014 white, coated board as the Economy CD Sleeves. They have a flap & and a Peel & Seel style closure. The window means that when someone gets a CD like this, the label is right in front of them. This, in turn, means that you are more likely to get more of these CDs opened than if you sent them in a closed face envelope.

Like the Economy CD Sleeves, these Mailers have to be Hand Cancelled for best results. Like most of the mailers in this category, they can be printed in one or in 4-colors.

(d) [Original CD Sleeves](#). [Original CD Sleeves](#) are very similar to [Economy CD Sleeves](#), except that they are twice as thick. The board they are made of is doubled in manufacturing. This provides somewhat more protection. But [Original CD Sleeves](#) should be marked for Manual Cancelled. They are not as strong as [Sure Seal Mailers](#).

Both the [Economy CD Sleeves](#) and [Original CD Sleeves](#) should be used for short term or medium storage only. But they can be used for mailing, if hand cancelled. Also, as with the [Economy CD Sleeves](#), these sleeves are flush cut and have no flap. Therefore, the Post Office requires them to be sealed with a sticker to keep the CD inside during mailing.

Because [Original CD Sleeves](#) are double the thickness of [Economy CD Sleeves](#), they offer slightly more protection than the [Economy CD Sleeves](#). But, they don't offer enough protection that they can be mailed with the same level of confidence as some of our more rigid mailers. They too are likely to be subject to the new Postal Regulations.

These are the main CD mailers. The spreadsheet describes the all of these and a few others that you might want to consider.

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5) Graphics, or Impact

You can use the charts that follow to get a quick summary of the tradeoffs in this area. But, with the possible exception of the [CD Wallet](#), [Compact Cases](#) and [DVD cases](#), most stock mailing products typically offer either more protection or more opportunity for impactful graphics. Most stock items do not offer both. Of course, this is not the case with custom products where both protection and graphics can be combined in the same product.

In terms of impact, [Mylar Bubble-Lined Mailers](#) have a unique look and impact. The [Economy CD Sleeves](#) are a “best buy” because they offer 4-color printing at a fraction of what you would expect. After that it is a matter of...

6) The Impact of Cost

While you would like all the CDs that you mail to arrive in good condition, cost is always a consideration. There may be times, for example, when the most cost-effective decision is to choose the least expensive envelope or mailer, try to make sure they are hand cancelled, and let it go at that.





It's been my experience that, typically, this is the case where you would be sending out CDs that have low intrinsic value. One example would be sending a memorial CD of a presentation to the audience for that presentation. In certain situations, training CDs would also be in this category.

However, it's also been my experience that, frequently, the choice of CD mailing media changes when you are sending out valuable CDs that have intrinsic value. We have a customer, for example, who sells an \$8,000 program on CD. Without question, he wants these to reach his customers whole, and undamaged. Therefore, the cost of mailer and postage is of lesser importance than the need to protect this CD.

Once again, I think the following charts cover this issue quite thoroughly.

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Cardboard Mailers Comparison Chart – For Both Storage and Mailing




Cardboard Mailers	Size	Material (board specs below)	Advantages	Downside
Traditional White Cardboard Mailers With Tuck-In Flaps  	Open End: <ul style="list-style-type: none"> 5-1/8 x 5-1/8 6 x 6 	.020 White Coated Board	Durable & Reusable Provides Good Protection of your CDs thru the mail, even in foreign countries! Glossy White Surface Easy to write on and Tuck-In Flaps easy to use.	You may want to tape the flap shut. Adds to the cost and the time to get it out the door. May need to place CD in a paper sleeve to prevent scratching, etc. May not be suitable for long term storage Cost – both to acquire and to mail.
	Open End, Center Seam: <ul style="list-style-type: none"> 6 x 8 7 x 9 9 x 11-1/2 9-3/4 x 12-1/4 11 x 13-1/2 12-3/4 x 15 13 x 18 	.028 White Coated Board		
	Open End, Center Seam: <ul style="list-style-type: none"> 8-1/2 x 10-1/2 	.018 White Coated Board		
Traditional Brown Kraft Cardboard Mailers with Tuck-In Flaps  	<ul style="list-style-type: none"> 6 x 8 9 x 11-1/2 9-3/4 x 12-1/4 11 x 13-1/2 12-3/4 x 15 13 x 18 17 x 21 18 x 24 21-1/2 x 27-3/4 	.037 Heavy Duty Board	Same as above	Same as above.

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**Cardboard Mailers Comparison Chart – For Both Storage and Mailing
(Continued)**

Cardboard Mailers	Size	Material (board specs below)	Advantages	Downside
White Sure-Seal Mailers With Peel & Seel Closure Cardboard  	<ul style="list-style-type: none"> • 5-1/8 x 5-1/8 • 6-3/8 x 6 • 6 x 8 • 7 x 9 • 9 x 11-1/2 • 9-3/4 x 12-1/4 • 11 x 13-1/2 • 12-3/4 x 15 • 13 x 18 • 17 x 21 • 8-1/2x10-1/2 	.020 white coated board .028 white coated board 018 board	Same as above	Same as above—except Peel & Seel Gum makes it easier to seal.
Brown Kraft Sure-Seal Mailers With Peel & Seel Closure Cardboard  <small>©mwg2002</small>	Open End: <ul style="list-style-type: none"> • 5-1/8 x 5-1/8 • 6-3/8 x 6 Open End, Center Seam: <ul style="list-style-type: none"> • 6 x 8 • 7 x 9 • 9 x 11-1/2 • 9-3/4 x 12-1/4 • 11 x 13-1/2 • 12-3/4 x 15 • 13 x 18 • 17 x 21 	.020 Brown Kraft board .028 Brown Kraft board		Same as above—except Peel & Seel Gum makes it easier to seal these Mailers.

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**Cardboard Mailers Comparison Chart – For Both Storage and Mailing
(Continued)**




Cardboard Mailers	Size	Material (board specs below)	Advantages	Downside
9 x 6 Wide Opening White, Sure-Seal Mailers With Peel & Seal  	9 x 6 Opening on the 9 inch side	.022 SBS SBS is Solid Bleached Sulfide board. It is the cleanest white stock. Finished one side. Not recycled. No post consumer waste.	Used for mailing CD & Literature or Booklets. Wide opening makes it easier and faster to insert materials in these envelopes. Tear Strip makes it easier to open	Same as above.
Compact Jewel Case Mailers With Peel & Seal Gum  	Two sizes: <u>For 1 Jewel case:</u> <ul style="list-style-type: none"> 5 x ½ x 5-11/16 <u>For 2 Jewel Cases:</u> <ul style="list-style-type: none"> 5 x 1 x 5-11/16 	.022 SBS SBS is Solid Bleached Sulfide board. It is the cleanest white stock. Finished one side. Not recycled. No post consumer waste.	Fast & easy to assemble. Durable. Provides Good Protection of your CDs thru the mail. Glossy White board Surface Easy to write on. Easy to apply labels, too. Seems to eliminate 99% or more of complaints about jewel cases damaged in mail	
Multipak Boxes 3-1/2 Diskettes  	3-1/4 x 1-3/8 x 3-5/8	.024 CCNB CCNB is Clay Coated News Back board, Coated One Side; grey inside. Recycled.	Holds 10 diskettes	

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Cardboard Mailers Comparison Chart – For Both Storage and Mailing (Continued)



Cardboard Mailers	Size	Material (board specs below)	Advantages	Downside
Mail Saver Envelope 	4-7/8 x 6-9/16 (4-7/8 x 6 Usable Space)	.012 White Coated Board	Mail 1 CD + 8-1/2x11 sheet of paper folded for cost of one oz. of postage	First, offers very little protection from stresses of mail processing. Second, <u>may not meet</u> new Postal Regulations for Mailing CDs – so check with Post Office.
Zip Disk Mailer 	4-1/8 x 3/4 x 4-1/4	.024 CCNB CCNB is Clay Coated News Back board, Coated One Side; grey inside. Recycled.	Used for mailing zip disks	Durable. Tabs for extra safety
Document Mailers  <small>©mwg2002</small>	12-1/2 x 9-1/2	.014 SBS SBS is Solid Bleached Sulfide board. It is the cleanest white stock. Finished one side. Not recycled. No post consumer waste.	Tamper-resistant. Peel & Seal. Opening on the long side makes it easy to fill the envelope.	Offers very little protection from stresses. However, the larger size means it will be not be processed by OCR machines. This means anything sent out in these mailers will not likely suffer most damaging stresses

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Cardboard Mailers Comparison Chart – For Both Storage and Mailing (Continued)






Cardboard Mailers	Size	Material (board specs below)	Advantages	Downside
Expandable Mailers  <small>©mwg2002</small>	10 x 7-3/4 x2 12-1/2 x 9-1/2	.020 CCNB CCNB is Clay Coated News Back board, Coated One Side; grey inside. Recycled.	Used for mailing books or large stacks of paper. Opens on the long side for ease of filling envelope	Same as Document Mailers.

CD Cases Comparison Chart

Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
Standard Jewel Cases   <small>©mwg2002</small>	5 x 5 Standard Jewel Cases. One side for one or more CDs. An Inserts are available that can accommodate several CDs. Left hand side of the Jewel Case is for small brochure or other information. Made of strong, but somewhat brittle plastic	<ul style="list-style-type: none"> • OK For Long-term storage. Only Jewel Cases and Tyvek Sleeves recommended for long-term storage. Jewel Cases protect CDs against most forms of damage, including chemical spills and blunt objects dropped on them <ul style="list-style-type: none"> • Can be in integral part of an Attractive Presentations 	<ul style="list-style-type: none"> • Suspends CD in a case and thru that isolates and protects the CD from a wide range of physical and chemical damages. One of only two storage media recommended for long term storage. • Permits Speedy Identification of Contents. • Does not interact chemically with disks over time. • Can add “inserts” to expand capacity to up to 6 CDs 	<ul style="list-style-type: none"> • Shows CD printed “card” thru face of case. It is visible at a glance for fast identification. Unlimited graphics because whatever you can print and fit into left hand section you can use. 	Takes up a lot of space. Needs either bubble-lined outer envelope or compact case mailer to protect it in the mail and make sure doesn't arrive damaged Compact case mailers seem to provide safer delivery than bubble-lined–i.e. fewer damaged CDs. Relatively expensive vs. other storage media




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CD Cases Comparison Chart (Continued)

Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
Slim Line Jewel Cases  	Slim-line Jewel Cases. One side for one CD; left side for literature.	Same as above – except takes up only ½ space of standard Jewel Cases	•Same as above Except that they <u>seem</u> to survive mailings better, and take only ½ the space that a Standard Case takes.	Same as above	Same as above, except seem to survive the mails better. See new Post Office Mail Design Analyst for up-to-date mailing info. Can only hold a single CD.
Ultra Slim Line Jewel Cases 	Ultra Slim Jewel Cases. One side for one CD; left side for literature.	Same as above – except takes up even less space than Slim Line Cases	Same as above	Same as above, except, available in a clear top/ color bottom version.	Same as above Can only hold a single CD.
C-Shell Jewel Cases   <small>©mwg2002</small>	C-Shell or Clam Shell Jewel Case Available in colors.	Same as above – except because they are a lighter weight and more flexible plastic, they tend to do much better in the mails and in storage. They don't break as easily as any of the Standard Jewel Cases.	Made of a somewhat softer plastic so it doesn't crack or break as easily as any of the more traditional Jewel Cases. Especially important if mailed	Can be printed on the face, on the outside.	More limited graphics choices



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CD Cases Comparison Chart (Continued)

Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
Strongbox CD Jewel Cases 	New: Strongbox CD Jewel Cases	Same as for Standard Jewel Cases above plus any situation that requires a stronger more durable case. Libraries, for example.	Stronger hinges so don't break as easily. Means you buy fewer and they last longer. Ideal for situations, like libraries where CDs are mailed or circulate frequently	Same as for Standard Jewel Cases above	Same as for Standard Jewel Cases -- except that there is a tradeoff to be made between the higher cost of these cases vs. their longer useful life. In other words, you'll probably buy fewer of these over time since they are more durable
DVD Cases   <small>©mwg2002</small>	DVD Cases. These are the same cases used to deliver DVDs, but they are frequently used to mail and store CDs	<ul style="list-style-type: none"> • Used for mailings and storage. Very strong. • Attractive Presentations possible due to an "Entrapment" This is a piece of see-thru plastic that covers the entire outside. • Storage. 	<ul style="list-style-type: none"> • CD goes on the right hand side and the left hand side offers space for literature. Very strong. • Mails without needing separate envelope 	<ul style="list-style-type: none"> • Insert in entrapment can be printed in up to 4-color process 	Post Office could require these to be sealed for mailing.





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Padded Envelopes Comparison Chart

Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
Standard Bubble-Lined Envelopes 	<p>Standard Bubble-Lined Envelopes with an outer layer made of Golden Kraft paper</p> <p>12 sizes including a 6 x 8-1/4 for use in mailing CDs or CD jewel cases</p>	<p>Excellent choice for mailing CDs. New postal regulations require better packaging & Bubble-Lined Envelopes help. CDs mailed in these envelopes are typically more than 1/4" thick. This means they are not subject to stress of Postal sorting equipment</p>	<p>Can save postage, under the new regulations starting 7/01/02 because a CD mailed in one of these envelopes will typically be thicker than 1/4". That means they don't go thru the sorting machines that stress and crack them.</p>	<p>Limited. Usually, labels are used to create attractive graphics.</p>	<p>They cost more than standard envelopes both to buy and the labor factor is higher, too. On the other hand, they lower your costs because most CDs mailed this way get there in good shape. Also, you may be able to mail this for less under the new regulations.</p> <p>May not be ideal for UPS. Check with them.</p> <p>Limited Graphics</p>
Bubble-Lined Envelopes With Tyvek Outer Layer  <small>©mwg2002</small>	<p>Bubble-Lined Envelopes With a Tyvek outer layer & Peel & Seal seal gum.</p> <p>9 sizes including a 6-1/2 x 7 (6 x 6-1/2 inside dimensions) for use in mailing CDs and CD jewel cases</p>	<p>Same as above, <u>except</u> that since Tyvek is much stronger and more durable than paper & can't be torn, these are ideal for conditions where the outer paper skin of the Bubble-Lined Envelopes might be torn off</p>	<p>Same as above</p>	<p>Same as above</p>	<p>Same as above except since Tyvek can't be torn, these <u>CAN</u> be used in situations where a paper outer skin might be torn off, like UPS</p>




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Padded Envelopes Comparison Chart (Continued)

Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
Bubble-Lined Envelopes With Colored Mylar Layer  	Bubble-Lined Envelopes With a colored Mylar outer layer	Same as above for basic sleeve	Unique, dramatic presentation. A total of 10 colors: black, blue, fuchsia, gold, green, purple, silver, teal, metallic gold, red	Same as above	Same as above
5 x 5 Single CD Vinyl Page   <small>©mwg2002</small>	5 x 5 Single CD Vinyl Page <ul style="list-style-type: none"> • Has 3 holes, cut flush. • Holds one CD 	Same as above for basic sleeve	For single CD. Goes into a 2, 3, 4, or 5 Ring notebook as a companion for literature. Easily visible. Convenient to store.		




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Padded Envelopes Comparison Chart (Continued)

Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
<p>5 x 5 Two-Compartment-Lined Vinyl CD Sleeves</p> 	<p>5 x 5</p> <p>Two - Compartment Fabric – lined Vinyl CD Sleeve</p> <p>.045 Clear Vinyl</p>	<p>Same as above for basic sleeve</p>	<ul style="list-style-type: none"> • Pocket holds CD and has separate section for either second CD or a few sheets of paper or small brochure. No Sticker required for mailing (has Peel & Seal) 		<p>Probably doesn't need to be hand cancelled. But, probably best to mail that way.</p> <p><u>Not recommended</u> for long-term storage. Paper is acid and may damage CD. + some of the coating might flake off over time.</p> <p>Not as strong as Tyvek Sleeves.</p> <p>Costs more than paper CD Sleeves</p>
<p>Vinyl Tamper-Proof CD Sleeves</p>   <p>©mwg2002</p>	<p>5 x 5 Tamper –Proof Vinyl CD Sleeve With Flap</p> <p>With & Without Dividing fabric</p>	<ul style="list-style-type: none"> • Used for mailings, primarily. • Attractive Presentations • Short-term storage. • Inside Mailing Envelope for extra protection. 	<ul style="list-style-type: none"> • Pocket holds CD. No Sticker req'd for mailing (has Peel & Seal) 	<ul style="list-style-type: none"> • Can be printed 4 colors (see out website for details) 	<p>Same as for CD Wallets.</p>



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White Coated Board Sleeves Comparison Chart

Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
Economy CD Sleeves  	5-1/8 x 5 Economy CD Sleeves 0.14 SBS White Board Cut Flush, No Flap, No Window	<ul style="list-style-type: none"> • Short-term storage. • Used for mailing. (Needs a sticker to close it to be mailable) • Attractive Presentations • Inside Mailing Envelope for extra protection. • As Part of overall Presentation 	<ul style="list-style-type: none"> • Lightweight • Inexpensive 4-color version available (see website for details) 	<ul style="list-style-type: none"> • Can be printed very inexpensively 4-colors (see out website for details) 	Must be delivered to Post Office and marked: Hand Cancel. <ul style="list-style-type: none"> • Post office requires sticker to secure contents in mail – so contents don't come out. Adds to cost. <p><u>Not recommended</u> for long-term storage. Paper is acid and may damage CD. + some of the coating might flake off over time.</p> <p>Not as strong as Tyvek Sleeves. Costs more than paper CD Sleeves</p>
Economy CD Sleeves With Windows With No Flap  <small>©mwg2002</small>	5-1/8 x 5 Window Version of Economy CD Sleeves 0.14 SBS White Board Cut Flush, No Flap	Same as above, for basic sleeve	Same as above, for basic sleeve But not as inexpensive as the non-window version	Same as above – but not as inexpensive as the window version	Same as above.





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White Coated Board Sleeves Comparison Chart (Continued)

Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
Economy CD Sleeves With Windows With Flap & Peel & Seel Gum 	5-1/8 x 5 Window Version of Economy CD Sleeves 0.14 SBS White Board With Flap & Flap has Peel & Seel Gum	Same as above for basic sleeve – Except does not need a sticker to close it.	Same as above, for basic sleeve But not as inexpensive as the non-window version	Same as above – but not as inexpensive as the window version	Same as above Except, since it has flap, it can be sealed for mailing without use of a sticker.
CD Sleeves .012 SBS White Double Thickness Board Mailers  ©mwg2002	5-1/8 x 5 CD Sleeves .012 SBS White <u>Double Thickness</u> Board No Window No Flap	<ul style="list-style-type: none"> • Short-term storage. • Used for mailing. (Needs a sticker to close it to be mailable) • Attractive Presentations • Inside Mailing Envelope for extra protection. • As Part of overall Presentation 	<ul style="list-style-type: none"> • Lightweight • 4-color version available (see website for details) 	<ul style="list-style-type: none"> • Can be printed up to 4-colors 	Must be delivered to Post Office and marked: Hand Cancel. <ul style="list-style-type: none"> • Post office requires sticker to secure contents in mail – so contents don't come out. Adds to cost. <p><u>Not recommended</u> for long-term storage. Paper is acid and may damage CD. & some of the coating might flake off over time.</p> <p>Not as strong as Tyvek Sleeves. Costs more than paper CD Sleeves</p>

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White Coated Board Sleeves Comparison Chart (Continued)

Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
CD Wallets  	6-1/4 x 6-1/4 CD Wallets .022 SBS White Board No Window 2 Sides: Opens Like a Book. One CD + Pre-printed materials (or 2 nd CD) in right hand pocket. Graphics on remaining panels. Has Peel & Seal Closure	<ul style="list-style-type: none"> • Used for mailings, primarily. • Attractive Presentations • Short-term storage. • Inside Mailing Envelope for extra protection. 	<ul style="list-style-type: none"> • Pocket holds CD and has separate section for either second CD or a few sheets of paper or small brochure. No Sticker req'd for mailing (has Peel & Seal) 	<ul style="list-style-type: none"> • Can be printed 4-colors (see out website for details) 	Probably doesn't need to be hand cancelled. But, probably best to mail that way. <u>Not recommended for long-term storage.</u> Paper is acid and may damage CD. + some of the coating might flake off over time. Not as strong as Tyvek Sleeves. Costs more than Paper CD Sleeves
Demo Disk Mailers  	5-1/8 x 5-1/8 Demo Disc Mailers .020 SBS White Board No Window 2 Sides: Opens Like a Book. CD goes in right side; graphics in left	<ul style="list-style-type: none"> • Used for mailings, primarily. • Attractive Presentations • Short-term storage. • Inside Mailing Envelope for extra protection. 	<ul style="list-style-type: none"> • Pocket holds CD. No Sticker req'd for mailing (has Peel & Seal) 	<ul style="list-style-type: none"> • Can be printed 4-colors (see out website for details) 	Same as for CD Wallets.

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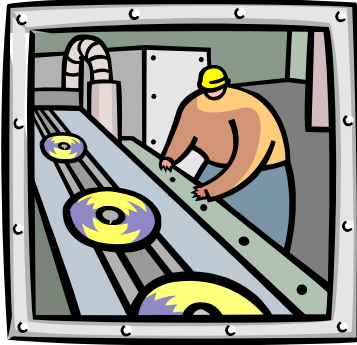
Important Warning: never use a ballpoint pen on a CD--it will ruin the CD

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In Conclusion...

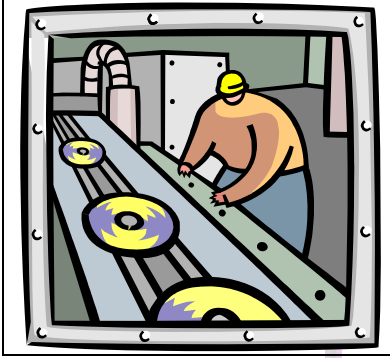


Your choice of mailing media is driven by the level of protection you want for your CD. If you want to make sure all will arrive in fine shape, then you need to use one of our very rigid and strong mailers. If you are willing to “take your chances”, then you have many more choices.

It has been my experience that customers mailing CDs that have a high intrinsic value (and therefore would be expensive to replace) will almost always go for the most protective mailing media. On the other hand, customers mailing CDs that are not intrinsically valuable are more likely to take their chances.

Finally, with the Postal Regulations changes that took effect in July of 2002, the cost of some forms of mailing media have gone up. This was part of the intent of the Post Office in requiring a surcharge. They wanted to encourage mailers of CDs to use sturdy mailers. And, again, you probably want to check with a Mail Design Analyst at the Post Office to make sure you are working with the latest changes as these changes had not been “locked in” when this White Paper was published.

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SECTION 5:

HOW “FILE AND FORGET” CAN COST YOU A FORTUNE

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Introduction

Once you have chosen a brand of CD that works with your computer, settled on a labeling solution and a storage media, you have to turn your attention to administering the integrity of what you’ve stored on the CD. There are three things involved in this:

1. Quality Control
2. Program migration
3. Cataloging, control, oversight

Much of this will be very basic. But the foundation builds everything else! Accordingly, you need to think about...

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1) Quality Control

The first thing that has to be done to insure the integrity of every CD you burn is to make sure immediately after burning it that what you wanted to write to CD was properly burned. This is true whether your program was for a use-and-toss, or for archiving purposes. We recommend you quality control every CD before you send it off to customers or put it in storage.

For example, suppose you burn a disc that is to be your Master Disc for all future copies--and don't check to make sure it is an exact copy of your master. If you do not quality control the CD, things you couldn't have predicted can interfere with the data being written correctly. For example, a hair or smudge might have blocked a portion of the information from being burned onto the CD, hence creating an imperfect copy. The point is you need to know this before you start rolling out your copies.

If this CD is for immediate use, as in a marketing situation, you're likely to get fast feedback from someone if they're having a problem. In that case, you can just replace the disc. The hidden problem, of course, is that if you get just one call like this, you don't know if it's an isolated problem with the one CD or if the whole run was the improperly burned. So, for that reason alone, you will want to confirm that the CD you've burned holds what you want it to hold.

On the other hand, if you burn a CD and put it away for a few years, and you do not check to see if you have a good copy, you won't know you have a problem till you try and use it. At this point, it will be too late to fix. This is especially crucial if this is accounting or forensic information or photos. It could be a catastrophe, after all that time, to find that your information is ruined or not available. The original source may no longer be available. Which would mean that there would be no way to recover from this disaster!

Thus, the absolute, first thing you want to do with any CD you're burning, is to check and make sure that it's a good copy. A quality assurance check, therefore, must be a routine part of your procedures.

Once you are sure that the CD or the Master CD has the data, music or photos you want on it, the next thing you need to worry about is...

2) Hardware & Software Migration

The principal fact of life for all digital storage media is rapid obsolescence—rapid obsolescence of both hardware and software. Users of CD technology should be reassured by the long physical life of CD discs, but they must not lose sight of the need to maintain a viable path for migration of information to new hardware and software platforms.

Digital storage media impose a strict discipline that human-readable records do not: their rapid evolution creates a continual progression of technology that cannot safely be ignored for too long. What is current, and a standard today, could be outmoded in 6 months or less. However, armed with knowledge of the physical nature of the media and of appropriate archival approaches, users

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of CD technology can have the best of both worlds--the functionality of digital media and a long life for stored data, music and pictures.

There are two areas where this is especially important: Hardware & Software.

Hardware. As every computer user knows, hardware is constantly changing. Just think about it: how many people use 5¼ floppy discs any more. And, if someone were to give you Betamax tape, could you play it? The answer is almost certainly "no".

Therefore, the first challenge for a long-term program is to keep your hardware current and updated. It's probably not necessary to buy the top-of-the-line CD-burner every time a new innovation is introduced, but it's crucial to upgrade when a major innovation that affects you or your business is introduced.

Software Changes and Obsolesce. There's another problem, however, and it doesn't get a lot of comment. This is the problem that is generally called "migration". What this means is that as new versions of programs come out, you need to make sure that the data, music or photos burned onto the CD by a particular program, can still be read by the latest version of that same program.

If you don't continuously update what you are storing, you may find that when you need to access what you have on that CD, the program has changed so drastically you cannot open it.

A more serious problem is the situation where a CD was created using a program that is no longer available or installed on your computer system. The company that produced the original software program that created the corresponding CD files has gone out of business or somebody has uninstalled the original software program from the companies' computer systems.

The two ways that are recommended to deal with this problem are (a) to make sure you keep at least 1 backup of the every corresponding program with those CDs with data-files that are dependant on the said corresponding programs and/or (b) when you install a new version of a program, make sure you open the archived files, open them using the current version of the programs, save them in the most up-to-date version and then burn the updated data files to a new CD-R or CD-RW.

I've read accounts of people who did everything right. They routinely backed up the data, music or photos. But they forgot to make a copy of the program they used to create their files on the CD. They had "moved on" but had neglected to keep a copy of the underlying program or had not updated their archived data files when newer versions of the underlying programs were released.

The best way to make sure this doesn't happen to you is to make sure you record a copy of the program along with the CD. In other words, it is recommended that you keep both the data files and the creating program on each CD you create.

Another useful approach is to maintain data in more than one form, or in more than one type of storage media – perhaps in analog form, if possible. In addition, keeping copies in different physical locations helps assure survival.

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To Summarize...



If you are storing data, music or photos on CDs with the intent that they are expected to endure long term storage, you will need to make sure, on a regular basis, that Hardware and Software upgrades and changes don't obsolete your CDs. They should be stored in a way and place that keeps them intact and you probably should have a backup copy of the program that created the said data files so you will not have any trouble accessing your data. Additionally, another way to make sure you will always be able to access your data files is to periodically open them in the latest version of the corresponding software and re-save them in the most current version; then write these files immediately to a new CD-R or re-write them on a CD-RW.

3) *Cataloging Your CDs: Making sense of your files...*

One of the more neglected aspects of working with CDs is the need to create a catalog or database of your CDs somewhere on your main computer. That way you'll be able to find the files you've stored on CD fast. If you don't implement a catalog or database system for managing your CDs, it won't be long before you have more discs than you ever thought you'd have and, all of a sudden, it's incredibly difficult to keep track of them all.

When that happens it will quickly seem easier to re-create the data, music or photos you are looking for than to search thru a stack of CDs by hand. A complete CD storage cataloging solution allows you to see what each CD has stored on it without having to shuffle thru each CD by hand.

When we asked our customers what they recommended for cataloging CDs, we got several outstanding suggestions. Here's what they told us.

Using MS-Access or a similar database tool. You can use MS-Access or similar database programs such as Paradox Or dBase to catalog and keep track of your CDs.

You might start out with three fields: CD#, Filename and date. Additional fields can be added, but they would depend on the user. Since all MS-Access-created databases are searchable, printable, and sortable, if you have a field that describes the file contents, you can search on key words and save yourself a lot of time.

There's another benefit to creating database catalogs for this task—you will be able to add the ability to search by the file format of the data files in question. You can add an additional field that lists the format of the files on each CD you create (e.g. WordPerfect 5.1, MS Word 6, etc). That way, when you change software, you could sort the database by file format to reveal only those CDs that need to be updated. For example, if you have CDs that are full of WordPerfect 5.1 Documents and wanted to update them to MS Word 2000, sorting by "FileType" field would enable you to do just this.

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For those of you without a database pre-installed on your computer or if you're not comfortable enough with databases in general, we highly recommend CD Catalog, a shareware program that accomplishes much of what we outlined above. To download a free evaluation version of this program, please visit <http://www.diginvent.com/cdcatalog/download/cdcatalog.exe>.



WHY YOU WILL WANT TO KEEP TRACK OF A CD'S

CREATION DATE - Whatever method you choose for cataloguing your CD, as part of your cataloging, you'll want to put the date of creation on every CD you create. That way, if you get a call from someone who has a question about what is on one of the CDs you sent them, you can simply ask them what date is on the CD they're asking about. That will tell you immediately what version they are asking about.

4) Effects of handling CD-Rs

CD-Rs, even though they are fairly robust, still need to be handled or treated with a certain amount of respect that is do to any form of recording media.

Scratches Top to Bottom

As mentioned before, CDs are a sandwich of various chemical layers. The two most important of those layers are the top metallic layer and the dye layer. The top metallic layer needs to be protected from scratches. Scratches on the bottom are also to be avoided; but they tend to be less critical.

Writing on a CD-R

The worst stress for CD-Rs is caused by severe flexing or application of a sharp point to the top (metallic) surface. These actions deform the substrate, potentially wiping out the information burned on them. A sharp stylus such as a ballpoint pen can cause severe compression to the metallic reflecting layer under the pen point. This can cause the dye to spread, thus deforming and possibly destroying the CD and its contents. Therefore, ball point pens are never to be used on a CD.

How sensitive are CD-Rs? If you accidentally left an unprotected CD-R in your desk drawer and accidentally wrote on a piece of paper directly on top of the CD-R, a great deal of damage could be inflicted. Again, to put it simply, **NEVER USE A BALLPOINT PEN ON A CD-R**.

5) Good Handling Practices

Protecting the CD-R. Whatever the purpose for creating a CD, it is likely to be handled many times. Obviously, when handled, handle very, very carefully. Avoid smudges or debris on the CD.

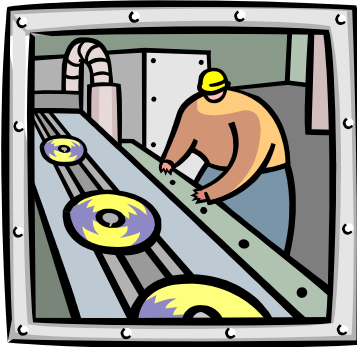
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Additionally, make sure you have good, strong cases or containers for your CD-Rs. This makes the protection of your CD-Rs much easier..

In addition to putting individual CD-Rs in one of the recommended storage cases, you may want to consider placing them in a closed box, drawer or cabinet. If they are important enough, you also might want to put them in a fire-proof safe. This gives additional protection from light, dust, climate fluctuations, and of course, fire.

Finally, handle CD-Rs only when you need to. Never allow them to remain out of their enclosures for long periods of time. Always handle discs by their edges. As with other media, don't eat, drink, or smoke around CDs.

In Conclusion...



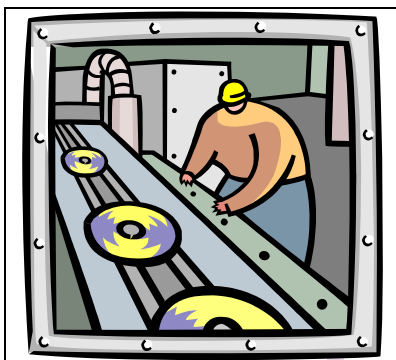
Once you have put a program in place to make sure that your CDs are updated whenever you change Hardware or Software, you will want to make sure to Catalog and Manage your CDs. This will help insure their usefulness for however long you need them.

You can't just file and forget CDs you burn.
You need to be concerned about:

Quality Control
Hardware and Software Migration
Cataloging, control, oversight.

Attention to Quality Control when burning your CDs, making sure software and hardware migration doesn't render your CDs unreadable, and cataloging all your CDs will insure that they will function when they have to and that you can use them in the way you intended.

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SECTION 6:

HOW IMPROPER STORAGE CAN LEAD TO CATASTROPHE...

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Introduction

Once you've found the brand of CD that works best with your CD burner and that consistently gives you the results you want, and once you've settled on a labeling method, it's time to turn your attention to storage issues. This section will discuss these issues.

1) Why CD Storage Programs Fail

There are 4 things you have to think about when creating your CD storage program. These are the things that will determine its success or failure. They are...

The length of time the CDs must be stored.
The environment in which it will be stored.
The storage media.
Scalability

The Length Of Time The CDs Must Be Stored. If you are using a CD for short term storage of data, music or photos -- where they will be used and discarded -- almost any storage media you choose will be fine. For this situation, you can use the least expensive CD and you can store them in almost anything on the market and your CDs will not likely be damaged. The reason is that most storage media-related damage takes time to create problems.

For example, we sell Paper CD Sleeves. If you are going to send out a marketing CD or an X-Ray that a physician will look at and discard, paper sleeves are fine. There are no real side effects because time-in-use is too short for any side effects to develop.

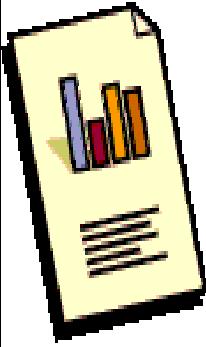
There are exceptions to this general rule, of course. Even where you are going to use and discard a CD, you still need to be concerned about the conditions under which you store even those CDs. For example, below you will find a warning not to put CDs in direct sunlight. This warning applies across the board.

No matter what you are doing with a CD, keep it out of the sunlight. Period.

Information on a CD-R or CD-RW (the only kind of CDs we are discussing in this White Paper) can be destroyed in as little as 2 hours when exposed to sunlight.

However, when you are archiving data, music or photos and they must be preserved for years - for the IRS or for a forensics situation, for example - then you need to be sure the storage media you choose will protect the CD from more than sunlight. They must be protected from a host of potential physical and chemical damages -- for years. There is far less room for error.

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NOTE—Of course, one of the really worrisome aspects of long-term storage of CDs is that because they are so new we don't have decades of success and failure to base our decisions on. Because we don't have a lot of experience to go on, a variety of stress tests have been devised to simulate the forces and conditions that CDs are likely to face over time. These tests subject CDs to amplified and accelerated versions of the chemical and physical forces they will have to survive. Some conclusions and recommendations have been put forth. These fall into two categories, the environmental and the storage media.

2) The Storage Environment...

What can go wrong with the storage environment? CDs can tolerate a fairly wide range of conditions without immediate damage. However, in addition to sunlight, heat & cold, humidity, and vibration are some of the conditions which can significantly damage CDs that are storing data, music or photos for long periods of time.

Sunlight. Because CD-Rs and CD-RWs look and feel like CD-ROMs it is easy to forget that they are optical media – which CD-ROMs are not. But, because CD-Rs and CD-RWs are optical media, they have to be kept **out of sunlight**. Whatever you do, you want to make sure that your discs are not exposed to sunlight. Direct sunlight can wipe out certain discs in as little as 2 hours.

It is the UV (Ultra Violet) portion of the sunlight that does the damage. It destroys the dye layer. Once the dye layer is damaged, the discs will very likely be unreadable. And you want to keep in mind that UV light can be present even on a cloudy day. Therefore, even on a cloudy day, you will want to keep your CDs away from windows, car dashboards, etc.

In talking to customers, I've found many who leave discs scattered on their desks, in a place where sunlight crosses for at least 20 minutes a day. Six days of that and they could be gone.

This no-sunlight warning is especially important if you are burning CDs of music. It is easy to forget that CD-Rs are optical media and to place one on the dashboard or the seat of your car – places, in other words, where sunlight can easily reach and erase what you have burned on them.

Temperature. As said earlier, CDs can tolerate a wide range of conditions. However, CDs are temperature sensitive. Therefore, they should be kept in an environment where there are no large swings in temperature.

Slow chemical changes such as oxidation of metallic reflecting layers, dark fading of dyes, and deterioration in polymer substrates and coatings are temperature - and humidity - dependent processes. These deteriorating processes will always proceed faster under warmer and more humid conditions. Therefore, one of the first things you want to turn your attention to is the temperature/humidity impact on your archival CDs.

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For archive quality writable CDs, for example, the prediction that they will endure for 100 years or more is based on a number of environmental assumptions: storage at “room temperature” -- 25°C (77°F) – and 40% RH (relative humidity). This means that cooler and/or drier conditions would lead to even greater life expectancies. Of course, warmer and damper conditions mean a lowered life expectancy.

Moreover, you can easily damage CDs by taking them from an air-conditioned environment to a hot one. Taking a CD from a cool building to a car on a summer day and just tossing it on the seat or on the dashboard could ruin the CD.

Humidity. Under certain conditions, humidity can cause the metal layer in the CD to oxidize. This would destroy some or all of the information on the disc. This has more to do with the CD than the packaging.

For archival storage, the prudent thing to do is to make sure you are using an archival quality CD. Generally, this means a CD using either a gold or silver alloy for the metallic layer.

The only CD in this class that we found universal acceptance for is the Mitsui Archival. It is rated at 400 years. Everything we’ve read and everyone we’ve talked to seems to rate this as the best choice – the most likely to perform as advertised -- for archival CD programs.

Salt air. One of our customers noticed that some of their CD's delaminated over time when exposed to salt air. These were music CDs they’d burned approx 6 months prior. They’d been using them on their boat till they discovered the damage. It is hard to say whether this sort of damage is something everyone needs to be concerned about. It may just be the brand of CD they were using. But, it points out the importance of proper storage.

Avoid extremes. Cycling conditions, especially between extremes of temperature and humidity, can be dangerous to CDs. Although moderate temperature and humidity changes ordinarily do no harm, fast changes between very warm and wet conditions to cooler and very dry conditions might produce warping and distortion.

The recommended maximum limit for temperature change is 15°C (27°F) per hour. For humidity, the recommended maximum RH change per hour is 10%. In practice, such steep gradients of temperature and RH are rare. The enclosures in which CDs are kept provide the first line of defense against such cycling, damping the rate of change in RH so that the CD inside its case or storage cabinet does not "feel" fast changes occurring in the outside

However, as noted, taking a CD from an cool environment to a hot one can damage CDs. For example, taking a CD from a building that’s air conditioned to a car on a summer day and just tossing it on the seat or on the dashboard could ruin the CD.

Vibration. Excess vibration of CDs is a remote cause of concern. But, if you are storing CDs in near a factory floor or other source of intense vibration, over time it is possible the CDs may suffer some damage. It is best to keep them in an area of low vibration or to put them in some sort of packaging that will isolate them from it.

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To Summarize...



The bottom line is that the best and most prudent storage program for you CDs should strive for a steady, room temperature, low UV light, low humidity and low vibration environment.

3) The Media Storage choices available...

There are 7 Media Storage choices. These are discussed below and summarized for you in the accompanying charts.

- [Jewel Cases](#)
- [Tyvek Sleeves](#)
- [DVD Cases](#)
- [Paper Sleeves](#)
- [Vinyl Sleeves](#)
- Films Sleeves
- Coated SBS Board

Jewel Cases, DVD Cases & Tyvek Sleeves [Recommended]. As I've said in all the previous sections of this white paper, if you are working on a CD program that has a "use and dispose" time line, almost any of these 7 storage choices will serve your purposes. It's when you want to store something on CDs for a long period of time that you need to choose with care.

Based on the tests that I've read and on the comments of our customers and experts I've talked to, there are only three of these choices that are suitable for long term storage: Jewel Cases, DVD Cases and Tyvek Sleeves. Depending on what you are trying to do with your CD storage program, you might want to confirm that these are right for you. Here are some general guidelines.

Jewel Cases. "Jewel cases" provide good protection against scratches, dust, light and some rapid humidity changes. They do an excellent job of suspending the CD and protecting it from both environmental and other physical and chemical accidents and stresses. They also provide a place for you to put an insert in one side. The insert can be used to identify the contents of the case. It can also allow a wide variety of graphics, if that is desirable.

There are three drawbacks to Jewel Cases:

They are made of a brittle plastic, so they are rather easily cracked.
The hinges break somewhat easily

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They take up too much space

The brittle plastic used to construct standard Jewel Cases is the reason they can easily crack. That is one of the chief complaints about generic Jewel Cases. In addition, the hinges of Jewel Cases break very somewhat easily. What this means is that you're likely to have to replace a percentage of them over time. It also means that you would not want to mail standard Jewel Cases without the protection of one of our Compact Case Mailers or a Bubble-Lined Envelope.

Alternatives to Jewel Cases--There are several products that offer at least partial solutions to the drawbacks of standard Jewel cases. They are...

DVD Cases

The Strongbox Jewel Case

Slim-Line & Ultra Slim-Line Cases

C-Shell Cases (Also called Clam Shell Cases)

Tyvek Sleeves. Offer good protection against most chemical accidents that can affect your CDs. One advantage of using a Tyvek Sleeve to store CDs is that, in combination with the CD, they take up the minimum amount of space.

They offer somewhat less protection, however, against physical damage. I am told that the German gov't thinks that Tyvek sleeves are the best solution to long term storage of CDs. If this is correct, it must mean that they have concluded that CDs being dropped, or something being dropped on them are not very likely events.

However, if you are in an environment where this form of damage is likely to happen, you may have to choose one of the Jewel Cases. This would also be true if you were in an environment with a lot of vibration. One of the jewel cases would isolate the CD, to some extent, from vibrations.

DVD Cases. These offer somewhat more protection than a jewel case. They are made of a far less brittle plastic. Thus, they have a far, far less tendency to crack.

In addition, DVD cases come with what is called an "Entrapment". This is a continuous, see-thru layer of plastic that wraps around the outside of the case. This Entrapment lets you insert almost unlimited graphics to identify the contents of the case. In terms of graphics, if you can print it and it fits you can put it in.

One drawback to using DVD Cases to store CDs, is that, as with standard Jewel Cases, DVD cases can take up a lot of space.

A new, patented Jewel Case has just come on the market that addresses at least some of these problems. This is the **Strongbox** version. It has a patented hinge that just about eliminates this source of problem. It is also made of a somewhat less brittle plastic so that it is a little more difficult to crack. Currently, a number of libraries are using these Jewel Cases because they've found that regular Jewel Cases just can't take the stress and abuse involved in lending out CDs and DVDs.

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Neither of these alternatives to Jewel Cases, however, address the biggest complaint I get from our customers about Jewel Cases, namely, that they take up too much space. Even a modest collection of music CDs, for example, can consume a large amount of space.

If space is an important consideration to you, you might want to consider these alternatives.

First, there are a number of [Slim-Line Jewel Cases & Ultra Slim](#). These offer the same level of environmental, physical and chemical protection as the standard jewel cases. But, they typically take up only a fraction of the space a standard jewel case takes. The Slim-lines are 3/8 inches. The Ultra-Slims are 1/8 inch. They are also slightly less easily cracked; though they are still made from basically the same kind of plastic and so do not really solve that part of the problem.

Next, there are the [C-Shell Cases](#). These are considerably thinner than the standard jewel cases. They are also somewhat thinner than both the standard and the slim-line jewel cases. In addition, because they are made of a much more flexible plastic, C-Shells are almost impossible to crack.

One drawback to the C-Shell is that there is no natural place to put graphics and you will typically have to slap a label on the outside of the case to tell what's in it. This may be fine as long as something more in the way of more elaborate graphics are not required as part of your storage program.

There are other substitutes for Jewel Cases that we offer on our site. For example, we offer a very thin jewel case that is made in France. It is ultra-slim – not much thicker than a CD – and extremely light weight.

However, this French style Jewel Case has a major drawback. Because it does not have hard sides, it does not offer the same level of lateral protection. The sides of these cases are made of a poly material which is not designed to protect the CD laterally. If something were to strike this area, in these jewel cases, this plastic would be quickly penetrated. If you are sure that is not something you have to worry about, this may be an ideal storage media for you.

Finally, we have a German-made CD case that is made of a hard plastic that is not as brittle. Therefore, it offers good protection against environmental, chemical and other physical damage. It is also relatively slim.

Moreover, it has a feature that is useful in many situations. It has a lever that lets you eject the CD without touching it. While this feature is more important for DVDs - which are quite sensitive to stress - it does provide a low-stress method of handling CDs that have to be frequently removed and then re-stored on a regular basis.

Other Storage Media And Why They Are Not Recommended

[Paper Sleeves](#). Are fine for short-term storage of CDs. However, concerns have been expressed about the acid content of paper over the long term. We just don't know if it's a factor or not. Therefore, most authorities recommend against it, for long-term storage situations.

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Second, if a chemical were to spill on a CD in a paper sleeve, it would not provide much of a barrier.

But, probably one of the most important reasons for not using paper sleeves is that, as CDs are moved in and out of one of these sleeves, it is very likely they will wear out from use. That would mean that you would have to replace sleeves on a regular basis.

Vinyl Sleeves. Offer several attractive features. For one thing they are very strong. A CD could be moved in and out of a vinyl sleeve any number of times without really damaging it. In addition, since it is completely clear, it is easy to see what's in one with ease.

In addition, they have a tamper-proof version. You load your CD into it, from the back, and then, using the Peel & Seal style adhesive on the back of the sleeve, you pull off the protective layer and paste in onto another surface.

These Tamper-Proof vinyl sleeves have two principle uses, in my experience. First, they are used in the backs of books and manuals that have CDs as part of their whole package. Where it is necessary, in certain software situations, to "prove" that the CD has been taken out and used, the tamper-proof feature will accomplish that.

Second, a number of our clients use them as part of their Disaster Recovery Program. They make a backup copy of a computer's hard drive, put that CD into one of these tamper-proof sleeves and then paste it up right on the computer, or very nearby. That way, if there is a crisis with that particular computer, they can pull the backup CD out the sleeve and they are up and running again, in almost no time at all.

The tamper proof feature is useful in these situations. It tells you that the CD has not been tampered with since it was created.

The reason that Vinyl Sleeves are not recommended for long term storage is that there is something of a consensus that, over time, the Vinyl will adhere to the CD. This would ruin the CD.

Moreover, under certain high temperature conditions, vinyl sleeves have been shown to off-gas some chemicals. Subsequent tests indicated that this gas was ammonia. While the high temperature conditions were unlikely to occur on an everyday basis, this plus the other worry that the vinyl might adhere to the CD over time, makes them a risky choice for long-term storage of CDs.

Film Sleeves. We offer a simple poly sleeves and a double pocket version. The double pocket version is primarily designed for taking music CDs out of their jewel cases. It is a very appealing form of storage for that purpose because it drastically reduces the amount of space it takes to store even a collection of thousands of CDs. In addition, because it has two pockets, it is possible to keep the original inserts and liner notes that came with the CD.

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Both of these sleeves, however, are mainly useful for short term storage for the same reason that the vinyl sleeves are not recommended for long term situations. The worry is that the sleeves may, over time, have a tendency to adhere to the CD which would ruin the CD.

Coated Paper Sleeves. There are several kinds of coated sleeves that can be used to store CDs: Economy, the Original demo disk & wallet. Each of these has a slightly different function.

Both the Economy and Original Sleeves are designed for storing CDs.

Economy Sleeves. These are made of .014 SBS and are lighter than the Original CD Sleeves. The Original CD Sleeves are made of 012SBS – but they are “double folded” so that they have a coated surface on the inside and out. This “double folding” makes them stronger than the Economy Sleeves. Therefore they offer better protection. But neither of these offers a level of protection designed to protect a CD in the mail

The two remaining coated sleeves are primarily designed as mailing products. However, if you send someone a CD in either a Demo Disk Mailer or a CD Wallet, since they are attractive and strong enough to get a CD from you to them, it is likely that they will be used for storage.

None of these products are suitable for long-term storage of CDs because, it has been shown in tests that, under certain conditions, some of the coated SBS sleeves, as with some vinyl sleeves, off-gassed some chemicals from the sleeve material or coating. Analysis showed that this was ammonia. It reacted with the CDs and rendered them unreadable.

Here again, we are talking about a test that was devised to simulate the conditions that a CD might face in a long term environment. Extreme temperatures are not a likely everyday occurrence. But, if you are storing CDs for the long term, you undoubtedly would want to maximize the probability that they will not fail. And, for that reason, these are not recommended.

Printable CD Sleeves. We offer one final product that might be used to store CDs: Our Printable CD Sleeves. This product comes to you flat and you run it thru the printer on your PC. You can create a wide variety of graphics – anything you can print on your printer. They are made of a 100lb White Tag and are intended for short run duplication situations.

One reason these might be thought suitable for long term storage is that the paper on these sleeves is considerably stronger than on our Paper Sleeves. Therefore, it might be thought that the heavier paper would remove one of the problems noted with Paper Sleeves: the fact that they were likely to wear out with use over time.

While I don't have any test data to share with you, it is my sense that you still need to be concerned about the acid content of paper. And, for that reason, I'd be reluctant to recommend them for long term storage.

4) Good Handling Practices

Protecting the CD-R. A basic tenet of safe handling is to provide good containers or enclosures

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for CD-Rs protection. In addition to putting individual CD-Rs in one of the recommended media, you want to consider placing them in a closed box, drawer or cabinet. This gives additional protection from light, dust and climate fluctuations, chemical and physical accidents.





In addition, it is always a good idea to handle CD-Rs only when they are being used. Never allow them to remain out of their enclosures for long periods of time. Always handle discs by their edges. As with other media, don't eat, drink, or smoke around CDs.

Finally, a good practice when handling CDs is to use an appropriate wipe. Some CDs will not play properly if there is as much as a hair or smudge on the reading side of the disc. When using a wipe, remember to wipe from the center out to the edge. Do not wipe in a circular motion.

It is always a good idea to handle the CD-Rs only when they are being used. Never allow them to remain out of their enclosures for long periods of time. Always handle discs by their edges. As with other media, don't eat, drink, or smoke around CDs.

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Cardboard Mailers Comparison Chart – For Both Storage and Mailing





Cardboard Mailers	Size	Material (board specs below)	Advantages	Downside
Traditional White Cardboard Mailers With Tuck-In Flaps  	Open End: <ul style="list-style-type: none"> • 5-1/8 x 5-1/8 • 6 x 6 	.020 White Coated Board	Durable & Reusable Provides Good Protection of your CDs thru the mail, even in foreign countries! Glossy White Surface Easy to write on and Tuck-In Flaps easy to use.	You may want to tape the flap shut. Adds to the cost and the time to get it out the door. May need to place CD in a paper sleeve to prevent scratching, etc. May not be suitable for long term storage Cost – both to acquire and to mail.
	Open End, Center Seam: <ul style="list-style-type: none"> • 6 x 8 • 7 x 9 • 9 x 11-1/2 • 9-3/4 x 12-1/4 • 11 x 13-1/2 • 12-3/4 x 15 • 13 x 18 	.028 White Coated Board		
Traditional Brown Kraft Cardboard Mailers with Tuck-In Flaps  	Open End, Center Seam: <ul style="list-style-type: none"> • 8-1/2 x 10-1/2 	.018 White Coated Board	Same as above	Same as above.
	<ul style="list-style-type: none"> • 6 x 8 • 9 x 11-1/2 • 9-3/4 x 12-1/4 • 11 x 13-1/2 • 12-3/4 x 15 • 13 x 18 • 17 x 21 • 18 x 24 • 21-1/2 x 27-3/4 	.037 Heavy Duty Board		

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Cardboard Mailers Comparison Chart – For Both Storage and Mailing (Continued)





Cardboard Mailers	Size	Material (board specs below)	Advantages	Downside
White Sure-Seal Mailers With Peel & Seal Closure Cardboard  	<ul style="list-style-type: none"> • 5-1/8 x 5-1/8 • 6-3/8 x 6 • 6 x 8 • 7 x 9 • 9 x 11-1/2 • 9-3/4 x 12-1/4 • 11 x 13-1/2 • 12-3/4 x 15 • 13 x 18 • 17 x 21 • 8-1/2x10-1/2 	.020 white coated board .028 white coated board .018 board	Same as above	Same as above—except Peel & Seal Gum makes it easier to seal.
9 x 6 Wide Opening White, Sure-Seal Mailers With Peel & Seal  	9 x 6 Opening on the 9 inch side	.022 SBS SBS is Solid Bleached Sulfide board. It is the cleanest white stock. Finished one side. Not recycled. No post consumer waste.	Used for mailing CD & Literature or Booklets. Wide opening makes it easier and faster to insert materials in these envelopes. Tear Strip makes it easier to open	Same as above.

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Cardboard Mailers Comparison Chart – For Both Storage and Mailing (Continued)



Cardboard Mailers	Size	Material (board specs below)	Advantages	Downside
Compact Jewel Case Mailers With Peel & Seal Gum  	Two sizes: <u>For 1 Jewel case:</u> <ul style="list-style-type: none"> 5 x 1/2 x 5-11/16 <u>For 2 Jewel Cases:</u> <ul style="list-style-type: none"> 5 x 1 x 5-11/16 	.022 SBS SBS is Solid Bleached Sulfide board. It is the cleanest white stock. Finished one side. Not recycled. No post consumer waste.	Fast & easy to assemble. Durable. Provides Good Protection of your CDs thru the mail. Glossy White board Surface Easy to write on. Easy to apply labels, too. Seems to eliminate 99% or more of complaints about jewel cases damaged in mail	
Mail Saver Envelope 	4-7/8 x 6-9/16 (4-7/8 x 6 Usable Space)	.012 White Coated Board	Mail 1 CD + 8-1/2x11 sheet of paper folded for cost of one oz. of postage	First, offers very little protection from stresses of mail processing. Second, <u>may not meet</u> new Postal Regulations for Mailing CDs – so check with Post Office.
Zip Disk Mailer 	4-1/8 x 3/4 x 4-1/4	.024 CCNB CCNB is Clay Coated News Back board, Coated One Side; grey inside. Recycled.	Used for mailing zip disks	Durable. Tabs for extra safety

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Cardboard Mailers Comparison Chart – For Both Storage and Mailing (Continued)





Cardboard Mailers	Size	Material (board specs below)	Advantages	Downside
Document Mailers 	12-1/2 x 9-1/2	.014 SBS SBS is Solid Bleached Sulfide board. It is the cleanest white stock. Finished one side. Not recycled. No post consumer waste.	Tamper-resistant. Peel & Seal. Opening on the long side makes it easy to fill the envelope.	Offers very little protection from stresses. However, the larger size means it will be not be processed by OCR machines. This means anything sent out in these mailers will not likely suffer most damaging stresses
Expandable Mailers 	10 x 7-3/4 x2 12-1/2 x 9-1/2	.020 CCNB CCNB is Clay Coated News Back board, Coated One Side; grey inside. Recycled.	Used for mailing books or large stacks of paper. Opens on the long side for ease of filling envelope	Same as Document Mailers.

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CD Cases Comparison Chart

Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
Standard Jewel Cases   <small>©mwg2002</small>	<p>5 x 5 Standard Jewel Cases.</p> <p>One side for one or more CDs. An Inserts are available that can accommodate several CDs. Left hand side of the Jewel Case is for small brochure or other information.</p> <p>Made of strong, but somewhat brittle plastic</p>	<ul style="list-style-type: none"> • OK For Long-term storage. <p>Only Jewel Cases and Tyvek Sleeves recommended for long-term storage.</p> <p>Jewel Cases protect CDs against most forms of damage, including chemical spills and blunt objects dropped on them</p> <ul style="list-style-type: none"> • Can be in integral part of an Attractive Presentations 	<ul style="list-style-type: none"> • Suspends CD in a case and thru that isolates and protects the CD from a wide range of physical and chemical damages. One of only two storage media recommended for long term storage. • Permits Speedy Identification of Contents. • Does not interact chemically with disks over time. • Can add "inserts" to expand capacity to up to 6 CDs 	<ul style="list-style-type: none"> • Shows CD printed "card" thru face of case. It is visible at a glance for fast identification. Unlimited graphics because whatever you can print and fit into left hand section you can use. 	<p>Takes up a lot of space.</p> <p>Needs either bubble-lined outer envelope or compact case mailer to protect it in the mail and make sure doesn't arrive damaged</p> <p>Compact case mailers seem to provide safer delivery than bubble-lined –ie fewer damaged CDs.</p> <p>Relatively expensive vs. other storage media</p>
Slim Line Jewel Cases   <small>©mwg2002</small>	<p>Slim-line Jewel Cases. One side for one CD; left side for literature.</p>	<p>Same as above – except takes up only ½ space of standard Jewel Cases</p>	<p>Same as above Except that they seem to survive mailings better, and take only ½ the space that a Standard Case takes.</p>	<p>Same as above</p>	<p>Same as above, except seem to survive the mails better. See new Post Office Mail Design Analyst for up-to-date mailing info.</p> <p>Can only hold a single CD.</p>





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CD Cases Comparison Chart (Continued)

Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
Ultra Slim Line Jewel Cases 	Ultra Slim Jewel Cases. One side for one CD; left side for literature.	Same as above – except takes up even less space than Slim Line Cases	Same as above	Same as above, except, available in a clear top/ color bottom version.	Same as above Can only hold a single CD.
C-Shell Jewel Cases  	C-Shell or Clam Shell Jewel Case Available in colors.	Same as above – except because they are a lighter weight and more flexible plastic, they tend to do much better in the mails and in storage. They don't break as easily as any of the Standard Jewel Cases.	Made of a somewhat softer plastic so it doesn't crack or break as easily as any of the more traditional Jewel Cases. Especially important if mailed	Can be printed on the face, on the outside.	More limited graphics choices
Strongbox CD Jewel Cases  <small>©mwg2002</small>	New: Strongbox CD Jewel Cases	Same as for Standard Jewel Cases above plus any situation that requires a stronger more durable case. Libraries, for example.	<ul style="list-style-type: none"> Stronger hinges so don't break as easily. Means you buy fewer and they last longer. Ideal for situations, like libraries where CDs are mailed or circulate frequently 	Same as for Standard Jewel Cases above	Same as for Standard Jewel Cases -- except that there is a tradeoff to be made between the higher cost of these cases vs. their longer useful life. In other words, you'll probably buy fewer of these over time since they are more durable

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CD Cases Comparison Chart (Continued)

Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
DVD Cases  	DVD Cases. These are the same cases used to deliver DVDs, but they are frequently used to mail and store CDs	<ul style="list-style-type: none"> • Used for mailings and storage. Very strong. • Attractive Presentations possible due to an "Entrapment" This is a piece of see-thru plastic that covers the entire outside. • Storage. 	<ul style="list-style-type: none"> • CD goes on the right hand side and the left hand side offers space for literature. Very strong. • Mails without needing separate envelope 	<ul style="list-style-type: none"> • Insert in entrapment can be printed in up to 4-color process 	Post Office could require these to be sealed for mailing.
Paper CD Sleeves With Window & Flap, No Gum  	4-7/8 x 5 24lb White Wove CD Sleeves with Round Window & Flap, No Gum.	<ul style="list-style-type: none"> • Short-term storage. Not recommended for long term storage • Inside Mailing Envelope for extra protection. • As Part of overall Presentation 	<ul style="list-style-type: none"> • Least expensive storage • Lightweight • Thin, so take up less space in storage • Flap can be extended & label placed over flap for filing scheme or to prove that customer agreed to terms of contract • Easy to identify contents of CD thru window 	<ul style="list-style-type: none"> • Can be printed offset, simple copy on back in up to 2 colors. 	Not suitable for long-term storage. Can tear with use and the acid content of the paper means it is not suitable for years of storage.





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Paper CD Sleeves Comparison Chart

Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside To Use
Paper CD Sleeves With Window & No Flap  	4-7/8 x 5 24lb White Wove - Paper CD Sleeves With Round Window but NO FLAP	Same as above, for basic sleeve	Same as above, for basic sleeve	Same as above	Same as above.
Paper CD Sleeves With Window, Flap & Partitiion 	4-7/8 x 5 24lb White Wove – Paper CD Sleeves With Round Window, Flap & Partition	Same as above for basic sleeve	Same as above for the basic sleeve -- Plus •Partition allows you to put more than one CD per Sleeve – or, one CD plus a CD & folded piece of paper or J-CARD	Same as above	Same as above
Paper CD Sleeves With Window, Flap & Peel & Seal  <small>©mwg2002</small>	4-7/8 x 5 24lb White Wove – Paper CD Sleeves With Round Window, Flap, & Peel & Seal	Same as above for basic sleeve	Same as above for the basic sleeve	Same as above	Same as above

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Paper CD Sleeves Comparison Chart (Continued)





Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside To Use
Printable Paper CD Sleeves  		<p>Can be printed on your computer printer. Delivered flat, you print them & then assemble.</p> <p>I deal for short runs where you want to have real impact.</p>	<p>Get the impact of great graphics for a short-run of CDs. For example, a band can print up a few and look like they' paid for a long run.</p>	<p>Whatever your PC's printer can handle.</p> <p>Templates Available to help you design what you want</p>	<p>Suitable for short runs only because they take time to assemble.</p>
Vinyl CD Sleeves, With No Holes Punched  	<p>5 x 5</p> <p>Vinyl CD Sleeves .045 clear vinyl</p> <p>Cut Flush, No Flap</p>	<ul style="list-style-type: none"> • Short-term storage. • Tough, & wear-resistant • Attractive Presentations • Inside Mailing Envelope • As Part of overall Presentation 	<ul style="list-style-type: none"> • 100% See-Thru. Permits Speedy Identification of Contents. • Invisible coating protects CD so it doesn't stick or remove info from CD 	<ul style="list-style-type: none"> • Shows CD label and CD completely. Therefore, if the CD is printed attractively it is visible at a glance. 	<p>Not recommended for long-term storage. Vinyl can possibly still stick to the CD, over a long period of time.</p> <p>Not mailable without outer envelope.</p> <p>Costs more than paper CD Sleeves</p>

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Vinyl Sleeves Comparison Chart

Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
Vinyl CD Sleeves With Partition/Cut Flush 	5 x 5 Vinyl CD Sleeves With Partition Cut Flush 0.45 Clear Vinyl	Same as above, for basic sleeve	Holds one CD & literature or two CDs. No invisible coating	Same as above – although, easy viewing depends, to some extent, on how CDs and literature are positioned in the sleeve. The graphics must be turned to face out, to be seen.	Same as above.
Vinyl CD Wallets 	5 x 5 Vinyl CD Wallets 0.45 Clear Vinyl Fold over, like a book. One pocket on each side.	Same as above for basic sleeve	Can put one CD on each on the left and right-hand side – or one CD on one side and literature on the other. No invisible coating		Same as above
Vinyl CD Sleeves With Holes Punched   <small>©mwg2002</small>	5 x 5 Single CD Vinyl Page has 3 holes, cut flush. Holds one CD	Same as above for basic sleeve	Same as above		



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Vinyl Sleeves Comparison Chart (continued)

Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
2 Compartment Fabric-Lined Vinyl CD Sleeves 	5 x 5 Two - Compartment Fabric – lined Vinyl CD Sleeve .045 Clear Vinyl	Same as above for basic sleeve			Probably doesn't need to be hand cancelled. But, probably best to mail that way. <u>Not recommended</u> for long-term storage. Paper is acid and may damage CD. + some of the coating might flake off over time. Not as strong as Tyvek Sleeves. Costs more than paper CD Sleeves
Tamper Proof Vinyl CD Sleeves  <small>©mwg2002</small>	5 x 5 Tamper – Proof Vinyl CD Sleeve With Flap With & Without Dividing fabric	<ul style="list-style-type: none"> • Used for mailings, primarily. • Attractive Presentations • Short-term storage. • Inside Mailing Envelope for extra protection. 	<ul style="list-style-type: none"> • Pocket holds CD. No Sticker required for mailing (has Peel & Seal)	<ul style="list-style-type: none"> • Can be printed 4-colors (see out website for details) 	Same as for CD Wallets.



Visit CDSleeves.com at
<http://www.cdsleeves.com>

Vinyl CD Sleeve Pages For 3-Ring Binders Comparison Chart

Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
Vinyl Page With Pockets For 2 CDs 	6 x 10-3/8 Vinyl Page With Pockets For 2 CDs mounted one on top of other	<ul style="list-style-type: none"> • Short-term storage. • Tough, & wear-resistant • Attractive Presentations • Inside Mailing Envelope • As Part of overall Presentation 	<ul style="list-style-type: none"> • 100% See-Thru. Permits Speedy Identification of Contents. • Saves space 	<ul style="list-style-type: none"> • Shows CD labels and CDs completely. Therefore, if the CD is printed attractively it is visible at a glance. 	Not recommended for long-term storage. Vinyl can possibly still stick to the CD, over a long period of time. Not mailable without outer envelope. Costs more than Paper CD Sleeves
Vinyl Page With Pockets For 4 CDs  <small>©mwg2002</small>	6 x 10-3/8 Vinyl Page With pockets for 4 CDs 2 on face and 2 on back that are mounted one on top of the other	Same as above, -- except that it holds more CDs.	Same as above	Same as above -- although, easy viewing depends, to some extent, on how CDs and literature are positioned in the sleeve. The graphics must be turned to face out, to be seen.	Same as above.


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Vinyl CD Sleeve Pages For 3-Ring Binders (continued)

Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
Vinyl CD Wallets (With Fold Over) 	5 x 5 Single CD Vinyl Page Has 3 holes, cut flush. Holds one CD	Same as above for basic sleeve	For single CD. Goes into a 2, 3, 4, or 5 Ring notebook as a companion for literature. Easily visible. Convenient to store.	Same as above	Same as above
2 Compartment Fabric-Lined Vinyl CD Sleeves  <small>©mwg2002</small>	5 x 5 Two-Compartment Fabric-lined Vinyl CD Sleeve .045 Clear Vinyl	Same as above for basic sleeve	<ul style="list-style-type: none"> • Pocket holds CD and has separate section for either second CD or a few sheets of paper or small brochure. 	Same as above	Same as above





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Vinyl CD Sleeve Pages For 3-Ring Binders (continued)

Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
Tamper-Proof Vinyl CD Sleeves With Flap  <small>©mwg2002</small>	<p>5 x 5</p> <p>Tamper-Proof Vinyl CD Sleeve With Flap</p> <p>With & Without Dividing fabric</p> <p>Back has a block of Peel & Seal style gum. The release liner is removed and these sleeves can be attached to almost any surface.</p>	<ul style="list-style-type: none"> • Used in the back of manuals. When the seal is broken, it signifies that the terms and conditions of the license have been agreed to. • Used in Disaster Recovery CDs are burned with Hard Drive or other data so that if there is a crash, you can be up and running fast.. 	<ul style="list-style-type: none"> • Tamper-proof feature. CDs are loaded thru back of this sleeve and once a CD has been inserted and the sleeve has been glued to a book or a computer, the flap must be tampered with to open it • In Disaster Recovery, you don't have to hunt for backup CD if a Hard Drive crash occurs. 	Same as above	Same as above

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Tyvek CD Sleeves Comparison Chart



Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
Tyvek CD Sleeves, With Flap (No Gum)  	4-7/8 x 5 16lb White Tyvek CD Sleeves with Round Window & Flap, No Gum.	<ul style="list-style-type: none"> • Short-term or long term storage. • Inside Mailing Envelope for extra protection. • As Part of overall Presentation 	<ul style="list-style-type: none"> • Lightweight, very strong storage so will not get damaged with extended use. • Chemically inert. Thus, over long time will not interact with or damage CD • Thin, so take up less space in storage • Flap can be extended & label placed over flap for filing scheme or to prove that customer agreed to terms of contract • Easy to identify contents of CD thru window 	• Can be printed offset, simple copy on back in up to 2 colors.	Costs more than paper CD Sleeves
Tyvek CD Sleeves, With No Flap  	4-7/8 x 5 16lb White Tyvek CD Sleeves With Round Window With NO FLAP	Same as above, for basic sleeve	Same as above, for basic sleeve	Same as above	Same as above.

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Tyvek CD Sleeves Comparison Chart




Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
Tyvek CD Sleeves With Window, Flap & Partition 	4-7/8 x 5 16lb White Tyvek CD Sleeves With Round Window, Flap & PARTITION	Same as above for basic sleeve	Same as above for the basic sleeve -- Plus •Partition allows you to put more than one CD per Sleeve – or, one CD plus a CD & folded piece of paper or J-CARD	Same as above	Same as above
Tyvek CD Sleeves With Window, No Flap & Peel & Seel (Mountable) 	4-7/8 x 5 16lb White Tyvek CD Sleeves With Round Window NO Flap & With PEEL & SEEL on back so these can be mounted at back of book	Same as above for basic sleeve, Plus -- anywhere a CD must be mounted – such as the back of a book or next to a computer for fast recovery from crash	Same as above for the basic sleeve	Same as above	Same as above

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White Coated Board Sleeves Comparison Chart

Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
Economy CD Sleeves  	5-1/8 x 5 Economy CD Sleeves 0.14 SBS White Board Cut Flush, No Flap, No Window	<ul style="list-style-type: none"> • Short-term storage. • Used for mailing. (Needs a sticker to close it to be mailable) • Attractive Presentations • Inside Mailing Envelope for extra protection. • As Part of overall Presentation 	<ul style="list-style-type: none"> • Lightweight • Inexpensive 4-color version available (see website for details) 	<ul style="list-style-type: none"> • Can be printed very inexpensively 4-colors (see out website for details) 	Must be delivered to Post Office and marked: Hand Cancel. <ul style="list-style-type: none"> • Post office requires sticker to secure contents in mail – so contents don't come out. Adds to cost. Not recommended for long-term storage. Paper is acid and may damage CD. & some of the coating might flake off over time. Not as strong as Tyvek Sleeves. Costs more than paper CD Sleeves
Economy CD Sleeves With Windows With No Flap  <small>©mwg2002</small>	5-1/8 x 5 Window Version of Economy CD Sleeves 0.14 SBS White Board Cut Flush, No Flap	Same as above, for basic sleeve	Same as above, for basic sleeve But not as inexpensive as the non-window version	Same as above – but not as inexpensive as the window version	Same as above.

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White Coated Board Sleeves Comparison Chart





Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
Economy CD Sleeves With Windows With Flap & Peel & Seal Gum 	5-1/8 x 5 Window Version of Economy CD Sleeves 0.14 SBS White Board With Flap & Flap has Peel & Seal Gum	Same as above for basic sleeve – Except does not need a sticker to close it.	Same as above, for basic sleeve But not as inexpensive as the non-window version	Same as above – but not as inexpensive as the window version	Same as above Except, since it has flap, it can be sealed for mailing without use of a sticker.
CD Sleeves .012 SBS White Double Thickness Board Mailers 	5-1/8 x 5 Original CD Sleeves .012 SBS White Double Thickness Board No Window No Flap	<ul style="list-style-type: none"> • Short-term storage. • Used for mailing. (Needs a sticker to close it to be mailable) • Attractive Presentations • Inside Mailing Envelope for extra protection. • As Part of overall Presentation 	<ul style="list-style-type: none"> • Lightweight • 4-color version available (see website for details) 	<ul style="list-style-type: none"> • Can be printed up to 4-colors 	Must be delivered to Post Office and marked: Hand Cancel. <ul style="list-style-type: none"> • Post office requires sticker to secure contents in mail – so contents don't come out. Adds to cost. Not recommended for long-term storage. Paper is acid and may damage CD. & some of the coating might flake off over time. Not as strong as Tyvek Sleeves. Costs more than paper CD Sleeves

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White Coated Board Sleeves Comparison Chart (Continued)

Storage Media	Description	Recommended For...	Unique Advantages	Graphics	Downside
CD Wallets  	6-1/4 x 6-1/4 CD Wallets .022 SBS White Board No Window 2 Sides: Opens Like a Book. One CD + Pre- printed materials (or 2 nd CD) in right hand pocket. Graphics on remaining panels. Has Peel & Seel Closure	<ul style="list-style-type: none"> • Used for mailings, primarily. • Attractive Presentations • Short-term storage. • Inside Mailing Envelope for extra protection. 	<ul style="list-style-type: none"> • Pocket holds CD and has separate section for either second CD or a few sheets of paper or small brochure. No Sticker req'd for mailing (has Peel & Seel) 	<ul style="list-style-type: none"> • Can be printed 4-colors (see out website for details) 	Probably doesn't need to be hand cancelled. But, probably best to mail that way. Not recommended for long-term storage. Paper is acid and may damage CD. + some of the coating might flake off over time. Not as strong as Tyvek Sleeves. Costs more than Paper CD Sleeves
Demo Disk Mailers  	5-1/8 x 5-1/8 Demo Disc Mailers .020 SBS White Board No Window 2 Sides: Opens Like a Book. CD goes in right side; graphics in left	<ul style="list-style-type: none"> • Used for mailings, primarily. • Attractive Presentations • Short-term storage. • Inside Mailing Envelope for extra protection. 	<ul style="list-style-type: none"> • Pocket holds CD. No Sticker req'd for mailing (has Peel & Seel) 	<ul style="list-style-type: none"> • Can be printed 4-colors (see out website for details). 	Same as for CD Wallets.

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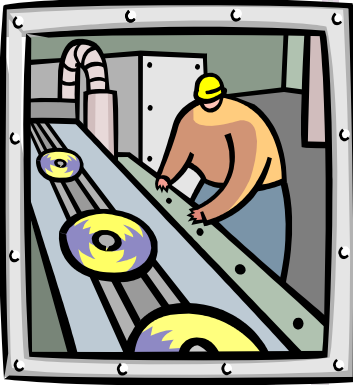
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Important Warning: never use a ballpoint pen on a CD--it will ruin the CD

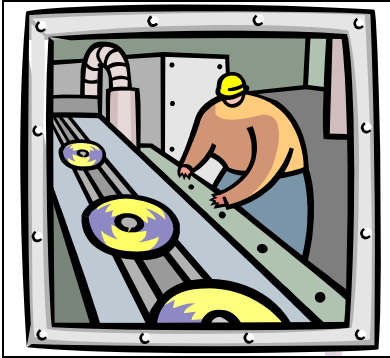
In Conclusion...



Storage requirements grow over time and are dictated, to a large extent, by the duration of storage required. A CD-storage solution should also provide complete scalability that allows organizations to start with a small prototype system that may grow into a full-fledged corporate data resource, spanning multiple jukeboxes with several terabytes of data.

Data storage and access requirements vary significantly. Organizations may need almost instant access to certain CDs, while others are accessed infrequently. Therefore it is a good idea to incorporate this kind of flexibility into your planning.

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CHAPTER 7: NEGLECT THE HUMAN FACTOR AT YOUR PERIL...

INTRODUCTION	1
1) WHERE ERRORS COME FROM...	1
2) CONTROLLING THE CONSEQUENCES...	2
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Introduction

When someone thinks of a disaster that could wipe out all of an organization's financial and customer data, they typically think of earthquakes, floods, or other natural disasters. But, sometimes it's the human factor. According to a recent study, industry data shows that human error is the largest contributor to reduced dependability and system crashes.

In fact, System Management accounted for 53% of system crashes studied between 1985 and 1993. Software failure, according to the same study, accounted for only 18%. Hardware failures were responsible for only 10% of failures. Obviously, therefore, when it comes to trusting your data, music or photos to a CD, it is essential to take human error into account.

1) Where errors come from...

There are three stages of cognitive processing for tasks: planning, storage and execution. The planning stage identifies a goal and a sequence of actions is selected to reach the goal. The selected plan is then stored in memory until appropriate to carry it out. Finally, the plan is implemented by the process of carrying out the actions specified in the plan.

Each of these stages has an associated source of error. There are the errors in the planning stage such as the plan devised not being suitable for reaching the desired goal. The storage stage tends toward incorrect omission of a planned action such as missing a step on a checklist. The execution stage is prone to incorrect execution such as a mis-keyed command.

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Because people are inherently fallible and errors are inevitable, the psychology of errors needs to be part of any planning. Current thinking is that since errors are likely to happen and difficult to prevent entirely, it is best to assume they will occur and to focus on controlling the consequences of error.

2) Controlling the consequences...

In a perfect world, the human factor wouldn't be a factor at all. But, we don't live in a perfect world, so things like spilled liquids and having an employee store discs at his house or transporting them in his/her car, can create problems, the consequences of which must be minimized. Some of those problems are...

- The first consequence of the prevalence of human error as applied to CDs is that any program designed for long term storage has to include backup. Stuff happens. In fact, if this White Paper does anything, it tries to highlight most of the common problems that occur so that they can be anticipated and dealt with.

Thus, many companies have devised plans that include some sort of off-sight storage of backups to their really important CDs. That way, if something unexpected or unanticipated occurs, it is not a complete disaster.

One of the things we've seen our customers do is to make a backup CD of the whatever is on their hard drive and store it right at their PC. They put this backup CD in one of our Tamper-proof vinyl sleeves and paste it right there next to the computer. Then, if that computer goes down, they break open that sleeve and they are back up and running within minutes. This eliminates running around looking for the backup disk.

Use of this Tamper-Proof Sleeve in this manner supposes that the information being copied over to it, is otherwise secure. This is, the CD should either not contain sensitive information, or if it does it should be appropriately protected. The sleeve itself is a part of that program. As long as the Tamper-Proof slap remains unbroken, it is a safe assumption that none of the information on this backup disc has been compromised by an unauthorized party.

- Second, CDs to be stored over a long periods of time, will be repeatedly moved in and out of the storage media you have chosen. But, every time it is removed and put back, it puts stresses on that media.

Moreover, over time, they are likely to be roughly handled -- if someone, for example is in a hurry. Because these stresses are hard to completely estimate over time, the choice of storage media has to anticipate and minimize the consequences of this sort of handling.

This makes Paper CD Sleeves unsuitable. Because they are cheap, they look like a good bet. However, heavy in/out stresses could easily wear out the sides of the sleeve and cause them to tear. The rougher these sleeves are handled, the more likely they are to tear. And, there is no way to know how roughly they will be handled.

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Rough handling could also create some debris that might gather on the CD. This debris is not fatal and it's not going to happen instantly. But, if it accumulates on the side of the disk that the laser must read, it can interfere with a laser trying to read the disk.

Another reason not to use Paper CD Sleeves for the long term is that, depending on the paper, a too-acid paper may attack the CD and cause delamination. For all those reasons, then, Paper CD Sleeves are not recommended for long term storage.

Similarly, coated paper sleeves, such as demo disk mailers and original CD Sleeves are not recommended for long-term storage. Coated sleeves showed a tendency toward the coating on the paper flaking off in tests. The rubbing of CDs against the sides of the sleeves when they are being moved in and out was the cause.

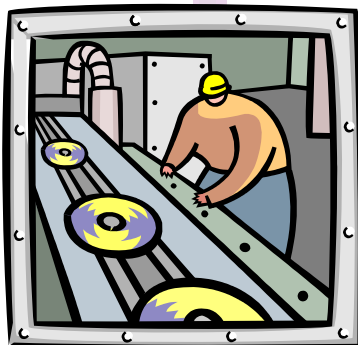
This flaking created even more debris in tests than plain paper sleeves. Therefore, they would not be a good choice for long-term storage. Granted, the tests that produced this flaking were extreme. But, if the goal is a foolproof storage, then this would be unacceptable.

In fact, the Tyvek sleeves and Jewel Cases offer the best long term storage benefits. Jewel cases provide good barriers against chemicals. They also offer good physical protection against someone dropping the CD or something dropping on the CD.

Tyvek Sleeves are attractive because they take up the minimum amount of space. In addition, Tyvek Sleeves don't interact with CDs and offer reasonable protection against a broad range of chemicals. They do not flake or tear.

I am told that these are some of the reasons that the German Gov't has authorized Tyvek sleeves as the preferred storage media for long term storage. I could not verify this information, but I can tell why this didn't surprise me when I heard it, because with the exception of something hitting the CD directly, or it being dropped, it had the best outcome in the tests of chemicals that might spill on a CD.

In Conclusion...



Minimizing CD damages requires careful analysis, planning and execution. It requires some fore-thought about the kinds of damages that can occur. It also requires appropriate implementation of those plans.

To the extent that good storage media help enhance the outcome of this aspect of dealing with CDs, it is the hope of this paper that it helps you accomplish that. Finally, If you want to minimize damages to your CDs over time, stick with either Tyvek sleeves or Jewel Cases.

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Addendum

Software Program	Description	Download The Program
AutoCDView	AutoCDView is an image viewer for photo collections on CDs. Simply copy the program files onto the CD when you add your images and it will act as a thumbnail viewer for all image files on the CD. Once AutoCDView has been added to the media, you just have to insert the CD and it will automatically display thumbnail images of all pictures.	Click Here To Download This Program
AUTOOption	This program was specifically written as a powerful, easy to use Autorun/ Autoplay enabler. Each button requires the entry of as few as only two things; the text to show on the button, and a command (the path to the file, program, folder, Internet site or another INI file). The background image is a bitmap which can be any size or dimension, created by the user.	Click Here To Download This Program
Autorun Action Flash	A tool to create CD start menus that can launch an application, a document, a web site or open Windows Explorer. It requires the entry of only a few variables, in particular one for the link (to the file, program, folder or net site you wish to open), and one for the length of time to show the flash screen.	Click Here To Download This Program
Autorun Creator	If you want to put your web site (or anything else) on a CD, it's handy to have an auto-start function that launches an initial page or program as soon as the CD is inserted. This can be accomplished by creating an INF file, or use the easy way and download this little tool.	Click Here To Download This Program

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Addendum (Continued)

Software Program	Description	Download The Program
AutoView	AutoView is autorun software for use on CDs/ CDRs. Upon starting of the CD, AutoView simply opens a document in the user's viewer. If no recognized viewer is found for that document then the software offers the User a choice of viewers installable from the CD (which you create).	Click Here To Download This Program
Burn To The Brim	Burn To The Rim (BTR) is a utility that quickly finds a near perfect solution for filling your media (CD, Zip...) completely with files and folders without running into broken files or wasted space.	Click Here To Download This Program
CD2TAPE	CD2TAPE is a tool to test your favourites CD tracks on your own designed TAPE layout. It features automatic computation of the remaining time for each side of the MC (music cassette) as well as internet support to access freedb (both cddb and http protocol supported).	Click Here To Download This Program
CD Autostart Creator	Distribute your websites on a CD and have your home page auto launch upon start. CD Autostart Creator has an easy to use interface and lets you create and distribute CD's with an autostart feature in just seconds.	Click Here To Download This Program
CD CoverKit* <i>*-recommended</i>	CD CoverKit allows you to create CD Covers, Inlays and CD Labels within minutes. CD CoverKit is simple, powerful and you'll find yourself printing out CD Covers and inlays in minutes. The program is only \$8.00 and it's a great addition to any software collection.	Click Here To Download This Program

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Addendum (Continued)

Software Program	Description	Download The Program
CD Cover Editor	CD-Cover Editor allows you to design and print your own CD Covers in a quick and easy way. The program features text editing as well as image support (JPG, GIF, BMP). This means that you can design nice looking covers with images as backgrounds for your track lists.	Click Here To Download This Program
CD Check	Checks your CDs (or some other media) and tells you which files are corrupted. It can also do a binary compare with copy on disk (preferred if possible).	Click Here To Download This Program
CDRom List Creator	Cdrom List Creator is a simple CD indexer, that can save and print directories and files names (on a CD or in Explorer), and store them in a searchable text file, allowing you to locate files, even if the CD is not inserted. The program provides an interface to search, view and organize your CD indexes.	Click Here To Download This Program
CDStart	CDStart is a small tool to create a custom .EXE file to launch documents or programs from a CD. You can customize it with your logo and completely change the look of the interface by editing the bitmaps. The program will open a neat menu that allows to launch a specified install program (or any other file) as well as a readme.txt.	Click Here To Download This Program

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Addendum (Continued)

Software Program	Description	Download The Program
Click N Design	Click n Design is a CD/DVD labeling software, that allows you to easily create spectacular, professional-looking CD/DVD Labels and Jewel Case Inserts. You can choose from hundreds of pre-made designs templates to get started and modify the existing colors, text and layout. Your options are virtually endless.	Click Here To Download This Program
Cypics	CyPics is a image cataloging software that uses a Microsoft Access or SQL Server database to organize your images. It is built to handle tens of thousands of digital images spread over many CDs or other removable disks. CyPics features include CD naming support , smart image registration, menu driven image selection, thumbnail views and slide shows.	Click Here To Download This Program
Digital Photos Database	Digital Photo Database is an image database & image file viewer program. It supports the majority of graphic file formats (jpeg, gif, bmp, pcx, tiff and targa). User can define categories and subcategories in a tree structure (similar to windows explorer folders) and assign every image to a certain category.	Click Here To Download This Program

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Addendum (Continued)

Software Program	Description	Download The Program
FillCD	FillCD is a simple program that takes a list of files or directories and tells you which of them fits best within a certain size limit. This way you can easily find out how to make the most of the space on a blank CD, Zip or Jaz disk, or whatever type of media you like. Just specify the size to use and how close to 100% you want to fill it, select the files or directories to use as "candidates," and click Compute. The results will appear, and you can move the fitting combination to another location.	Click Here To Download This Program
Handy Backup	Handy Backup 3.5 is designed to work with just about any type of storage media, including: <ul style="list-style-type: none"> ▪ CD-R/CD-RW media; ▪ remote FTP servers; ▪ local network drives; ▪ ZIP, JAZ, MO; ▪ HDD and floppy disks. 	Click Here To Download This Program
Kudo Internet Multimedia Suite	Kudo Image Browser - Automatically catalogs image, movie and document collections. Supports hundreds of image, multimedia and document file types. Provides tools for managing and publishing selections on CDs and the Internet. Instant image gallery Web pages and Web site files.	Click Here To Download This Program
Label Creator 4000 Special Edition	Label Creator 4000 Edition Special is an easy to use tool to create, design and publish your own Cd labels (round cd, Front label, Back label). You can create a gradient label, add a logo, a photo or text and preview the design as you go.	Click Here To Download This Program

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Addendum (Continued)

Software Program	Description	Download The Program
MediaMenu	MediaMenu is a customizable full-screen CD menu with an built in image viewer and launcher for Windows Media player. It allows you to create an attractive full screen menu for your CD that links to the CD content, launches applications and even web site links.	Click Here To Download This Program
Musicmatch* <i>*--recommended</i>	Our next software program, Musicmatch, is one of the leading and most fully featured MP3/Music players. It not only offers complete support for playing MP3s and other types of audio files, but it also includes the ability to make rich jewel case covers and CD labels. Musicmatch even automates the process, using your playlists to build the jewel case covers.	Click Here To Download This Program
Multimedia Builder MP3	Mutimedia Builder makes it easy to create a professional multimedia creation in minimal time and at low cost. You can create Autorun CD browsers.	Click Here To Download This Program
Offline CD Browser	Offline CD Browser allows you to index and catalog your removable drives to get your files organized and categorized. By indexing your drives (or folders), you can quickly locate files stored on CDs without having it inserted in your drive.	Click Here To Download This Program
Photo Album Designer	Photo Album Designer is a photo album software which enables you to create a personalized photo album in just a few steps.	Click Here To Download This Program

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Addendum (Continued)

Software Program	Description	Download The Program
PhotoCD Browser	PhotoCDBrowser is AutoRun program for photo CD-archives in TIFF, JPEG, TGA, EPS, PCX formats. Upon insertion of the CD, the program will display a small navigation browser and show the photos in full screen mode. You can include background sound on an per-image basis, include optional background music and more. The user can zoom and rotate your photos or view them in slideshow mode.	Click Here To Download This Program
Quick Menu Builder	Quick Menu Builder allows you to quickly create custom CD launch menus, using a skin of your choice (image file). You can add buttons and specify an action for each. The program supports Explore folder, Execute program, Open Document, Open multimedia file, Play Sound, Link URL, E-mail and others.	Click Here To Download This Program
Ruby	Ruby is a database-driven program for cataloging CD-R disks offline. The program scans and indexes your CDs and allows you to search through them and locate files just like the Windows Find feature - without the CD in the drive.	Click Here To Download This Program
Safe CD	SafeCD enables you to create password protected, encrypted CD images (you burn with your burner software). The files are stored in DAT files on the CD, which are not only encrypted, but also randomly dispersed, so that it would be very difficult to re-create them, even if the encryption was cracked.	Click Here To Download This Program

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Addendum (Continued)

Software Program	Description	Download The Program
SmartDraw Photo	SmartDraw Photo provides a quick and easy way to organize, enhance, print, and share your digital photos. At the same time, it works as a powerful graphics editor for creating and editing images or web graphics.	Click Here To Download This Program
Spy-CD	Spy-CD (formerly Hi Spy) is a top-notch way to add excellent search capabilities to your Website or CD.	Click Here To Download This Program
TestPath	TestPath is designed to check the files you write/burn on a new CD-R, although you can check any two paths on your machine. Now you can be sure that all files that you wrote to the CD-R are there and without write errors.	Click Here To Download This Program
TuneZip	Think of it as “the Digital Jewelcase for the Digital World™.” Now, you’ll able to take all your favorite playlists and easily turn them into a single, self-extracting file. Easier and in less time that it takes to burn a CD.	Click Here To Download This Program
UF Autorun Creator	UF AutoRun Creator is a very easy to use tool that allows you to create auto-starting web sites on a CD. It creates an autorun package which will automatically launch a HTML file of your choice when the CD is inserted.	Click Here To Download This Program

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Addendum (Continued)

Software Program	Description	Download The Program
Visual Autorun	Digitope Visual Autorun is an easy to use wizard-style program to create CD interfaces. It offers advanced features all in an easy-to-use streamlined interface with an step-by-step approach that can create a great looking Autorun menus in just a few minutes.	Click Here To Download This Program
Virtual CD	Virtual CD provides 200x speed and noiseless CD/DVD access without the physical drive. No need to insert a CD and no more tiresome CD swapping. Virtual CD copies CD/DVDs to your hard-disk using efficient compression algorithms, providing virtual CD drives on your Windows desktop.	Click Here To Download This Program
Virtual Album	Virtual Album is a database driven software, that is designed to manage and organize family photo albums. You can acquire your photos from scanner, digital camera and from a file on any media. Virtual Album lets you add to every photo the Year, Place, Event, Names and more.	Click Here To Download This Program

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