

INFORMATION SANITIZATION & DESTRUCTION

POCKET REFERENCE GUIDANCE



DOCUMENT DESTRUCTION
MAGNETIC MEDIA SANITIZING
MAGNETIC MEDIA DESTRUCTION
OPTICAL MEDIA DESTRUCTION
MIXED MEDIA DESTRUCTION



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Information is Everywhere

Just as there are a variety of information storage devices , there are also a variety of methods to “destroy” or “sanitize” them. We will address the various types of media and the methods of destruction as they relate to information gathered by, stored by, or created by various government agencies.

There are two major categories of information based on the sensitivity or classification of the information and as a result there are two principal destruction levels. Information that is characterized as **Classified** or above, is destroyed/sanitized based on rules and procedures set forth by the **National Security Agency/Central Security Service**.

Information that is not classified, (or above) is characterized as **Controlled Unclassified Information, (CUI)**. CUI is destroyed based on available means and is not governed by the NSA. This information should be destroyed/sanitized based upon organizational or best practice requirements.

What we typically think of as information storage media has grown from paper to highly sophisticated items such as optical disc and perpendicular storage arrays. Storage media is typically characterized as follows:

Paper Only

Punched Tape

Optical Media

Magnetic Media and
Storage Devices

Solid State
Drives



Media Destruction Guide

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Paper Destruction

Shredding may not be the only way to keep sensitive information printed on paper from being seen by the wrong people, but it is widely considered the fastest, safest and most effective. Once seen only in government or military offices, today paper shredders are as common as computers, copy machines and other office equipment.

Types of Paper Shredders and Security Level Designations

Strip-Cut - A single cutter reduces paper to long ribbon like strips. Documents may be reconstructed with relative ease.

Recommended Uses - Home use.

Security - Level 1 and Level 2.



Cross-Cut - Two or more sets of cutters slice paper in one way and then the other to produce a much smaller confetti like particle. Reconstruction of documents is extremely difficult but attainable.

Recommended Uses - Appropriate for CUI (Controlled Unclassified Information) and all commercial uses.

Security - Level 3, Level 4 and Level 5.



High Security NSA Listed Shredders - Essentially Cross-Cut shredders with substantially smaller waste particles no larger than 1mm x 5mm. Reconstruction of documents is considered virtually impossible.

Recommended Uses - Paper with Top Secret and/or Classified Information.

Security - Level 6.



Note: For a list of shredders that comply with high security destruction requirements, see the NSA Evaluated Products List (EPL). In order for a shredder to be listed on the EPL, manufacturers must prove that particle size is 1mm x 5mm or smaller without exception.

Paper Shredder Sheet Capacity

The amount of paper fed into a shredder should be consistent with the unit's rated sheet capacity. This rating "should" represent the maximum number of sheets of 8.5" x 11" copy paper that can be shredded at once. Attempts to feed

more paper may be successful but over time, will cause excess wear and tear on the cutting head and overall unit.

CAUTION: Unless you're using an NSA listed classified (Level 6) shredder, there is no standard paper weight that manufacturers must base sheet capacities on. Some less ethical manufacturers may test with lighter paper to inflate sheet capacity ratings in attempts to gain a marketing advantage. An indicator of this practice would be a shredder that seems to "slow down" or "struggle" even when the amount of sheets being shredded are less than or equal to the rated capacity.



NSA Durability Ratings

In 2003 the National Security Agency introduced one hour durability ratings and began to perform testing on all NSA Listed Classified (Level 6) Paper Shredders. The test itself is simple.

An operator takes the maximum number of sheets a manufacturer claims can be fed at once and continuously feeds that amount over the course of one hour.

Standard 20 lb. copy paper is used. If at any time during the test, the shredder stops due to jams, overheating, etc., the machine fails. The results which

are stated in total reams of paper by sheets fed, provides an accurate measure of thruput. For example, a machine with



an NSA 1 Hour Durability Rating of 21 reams feeding 10 sheets will destroy 10,500 sheets in one hour. The ratings also provide users an excellent criterion on which to compare competitive units.

Caring for Paper Shredders

When used and maintained properly, a good paper shredder will provide years of trouble free service. The following tips will help keep your shredder performing at optimum levels.

- 1. Never overfeed** - Overfeeding puts undue stress on a paper shredder's motor, gears and cutting blades. The negative impact of overfeeding is significantly magnified as waste particle sizes get smaller.
- 2. Never introduce foreign objects** - Non-paper items can damage cutting heads and cause blades to dull or break.
- 3. Clear jams immediately** - An uncleared paper jam can permanently cause cutter misalignment.
- 4. Lubricate the cutting head often** - Proper cutting head lubrication will increase the efficiency and effectiveness of a shredder by helping to prevent paper jams and keeping the cutting heads cool. Ensure proper lubrication by selecting a shredder with a factory installed automatic oiler. Units without auto oilers should be lubricated by applying oil to paper and feeding it into the shredder.
- 5. Make sure proper power is available** - If not powered properly, a paper shredder will not run effectively or in some cases at all. Even if the proper electrical outlets are available, they may not provide sufficient power for best performance. Some machines require a dedicated circuit. Another possible reason for an under performing machine is voltage drop caused by outlets being too far from a circuit breaker. Use of extension cords can create similar problems.



Helpful Resources

NSA EPL for High Security Paper Shredders
www.semshred.com/epl

Paper shredder video overview
www.semshred.com/ps



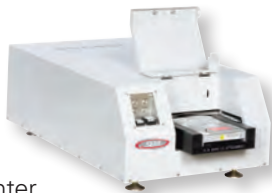
Magnetic Media Erasing/Sanitization

Degaussers use powerful magnetic fields to erase/sanitize magnetic storage media such as hard drives, backup tapes, floppy disks, audio/video cassettes, even reel-to-reel tape.

Levels of Erasure

While levels of erasure can vary greatly based on a variety of factors, there are really only two classifications that matter: NSA Evaluated and CUI - Controlled Unclassified Information.

CUI Degaussers are appropriate for virtually all commercial use applications as well as some government and military uses. CUI Degaussers are typically smaller, lighter and less expensive than NSA Evaluated Degaussers.



CUI Degausser

NSA Evaluated Degaussers - Classified data stored on magnetic media must be degaussed in an **NSA Evaluated Degausser**. The National Security Agency performs tests on degaussers to judge their ability to remove data. The units that they deem effective for these purposes are listed on the NSA Degausser Evaluated Products List. If a degausser is not on the EPL it cannot be used to degauss Classified media.



NSA Evaluated Degausser

A Partial List of Media that can be Degaussed

Magnetic Hard Drives: All types including LMR and PMR.

Computer Tapes: DLT, SDLT, LTO, QIC, DAT, Travan, AIT, 8mm

Removable Disks (floppy): 5.25" & 3.5" Floppy, ZIP, JAZZ, REV, Syquest

Audio Tapes: Cassette, Mini/Micro Cassette, Reel-to-Reel

Video Tapes: VHS, Beta, SVHS, Mini DV, 8mm,

Items that Can't Be Degaussed

USB Thumb Drives, Compact Flash, Optical Media (CDs and DVDs), Solid State Hard Drives, Smart Phones

Types of Degaussers

There are two basic technologies used in Magnetic Media Degaussers. One based on Permanent Magnet Technology and the other on Electromagnetic Technology.

Permanent Magnet Degaussers

Use an array of powerful Permanent Rare Earth Magnets to erase both Non Classified (CUI) and Classified Data. The degausser creates an intense magnetic field without requiring any electricity. Once degaussed, the data on the magnetic media (Hard Drives or Tapes) is completely and permanently removed.



For classified media, a degausser must be listed on the NSA's Evaluated Product List (EPL). This NSA evaluation and inclusion on the EPL ensures the degausser is capable of 100% electronic sanitization. A list of evaluated degaussers can be found at www.semshred.com/epl

Advantages of Permanent Magnet Technology

Productivity: Since it does not generate any heat, a permanent magnet degausser may be used continuously.

Obsolescence: Permanent Magnets do not degrade over time, reducing obsolescence and total cost of ownership.

Fast Cycle Times: Media is erased as fast as it can pass between the magnets. Cycle times are 15 seconds or less.

Electromagnetic Degaussers

Apply an alternating field that is created using AC power through the use of a bank of large electric capacitors. Once energized, these capacitors allow the energy to flow to a coil around a chamber where the media to be degaussed resides. The flow of current around the chamber creates a magnetic field that degausses the media. This discharge of power takes less than a second however, charging the capacitors to a level capable of degaussing Classified media may take more than one minute.



Disadvantages of Electromagnetic Technology

Productivity: Build up of heat can shut down the system resulting in loss of productivity.

Obsolescence: Capacitors degrade over time and have a finite life span. Degrading capacitors may not effectively degauss media. Upgrades or replacements are very costly.

Slow Cycle Times: Process to charge the capacitors is very slow (up to 60 seconds) when compared to permanent magnet technology.

How can you be sure the data is gone?

To be certain they are functioning properly, NSA Guidelines suggest that degaussers “should be re-tested periodically according to manufacturer’s recommendations”.

Different manufacturers test in different ways. Some use a low density VHS or Data Tape. The most thorough and accurate recertification is completed using a High Density Hard Drive. Drives are degaussed in the customer’s unit and then sent to a forensic laboratory where experts search for remnant data using sophisticated test equipment. If no evidence of data is found on the drive, the degausser is recertified.

Degaussing Glossary of Terms

Oersted - Oersted (abbreviated as Oe) is a measurement of magnetic energy. The higher the Oe rating of magnetic media, the more magnetic force is required to change its magnetic polarity (erase/sanitize it’s content).

LMR (Longitudinal Magnetic Recording) - The common method of digital recording on a magnetic material. The bits are laid out end to end, and the direction of the magnetic charge is horizontal with respect to the storage medium.

PMR (Perpendicular Magnetic Recording) - is a technology for data recording on hard disks. Perpendicular recording can deliver more than three times the storage density of traditional longitudinal recording.

Helpful Resources

NSA EPL for Degaussers www.semshred.com/epl

Degausser video overview www.semshred.com/mep3



Magnetic Media - Physical Destruction

Another option for dealing with data on magnetic media is physical destruction. There are two primary methods to do this, crushing and shredding.

A **hard drive crusher** uses powerful force applied to the hard drive chassis. Eventually the force buckles and/or pierces the drive housing. The delicate internal platters, and read/write heads are damaged beyond reasonable recovery methods.

A **hard drive shredder** operates much the same way as a cross-cut paper shredder except that the cutting head is significantly larger and more rugged. Drives enter the cutting mechanism where they are literally ripped to shreds. The result is a pile of twisted metal that barely resembles a hard drive.



For Classified Drives, physical destruction is required after degaussing

For unclassified media, a crusher or shredder used on it's own is acceptable. Damage to drives, is so significant, it's virtually impossible for anyone or entity, except those with the most extensive resources, to recover data. However, for classified drives or for added security, it is advisable to degauss drives, then physically destroy them. This two step approach is mandated by the DoD for Classified data. A degaussed drive looks the same as a non-degaussed drive. As such, in order to provide additional visual assurance that the data is non recoverable, physical destruction is needed.

Destroy more than just hard drives

Crushers crush, and shredders shred. They don't discriminate based on what they are fed. So, they can be used for other media like solid state drives, optical media, MP3 players, touch pads, e-readers, cell phones, PDAs, PC Boards and more.

Crusher or Shredder... Which is right for you?

Typically crushers are used in lower volume applications, 100 drives per day or less (a quality hard drive crusher needs about 8-10 seconds to crush a drive).

When volumes are much greater, a shredder makes more sense. These larger machines (about the size of a washer/dryer) can be fed faster and operated continuously for long periods of time. Small hard drive shredders destroy up to 500 drives per hour, larger machines, up to 2,500 drives per hour.

The impact of hard drive type on thruput

Hard drives come in various sizes and materials of construction. Smaller hard drives found in laptop computers are easier to destroy than standard drives found in personal computers or servers. Both crushers and shredders can destroy any size drive, but thru-put will be much higher for smaller drives. For example, a crusher will destroy one personal computer hard drive in 8 seconds. However, the same crusher can destroy four notebook computer drives stacked on top of each other, in the same amount of time.

Helpful Resources

Video Demonstrations of Hard Drive Crushers and Shredders
www.semshred.com/videos



Optical Media

Optical media refers to data storage devices that digitally write and read data via a laser diode. The technology was developed in the late 1950s, but didn't become widely used until the introduction of Compact Discs (CDs) and Digital Video Discs (DVDs) in the 1980s and 1990s.

Methods of Destruction

There are three proven techniques for destroying optical media.

Declassifying or Grinding

Disintegration

Shredding

Declassifying uses abrasives to grind the data bearing surface from a disc turning it into dust. This works well for CDs that store data on the external surface of the disc. It can also work for DVDs, but since data on DVDs is contained between two disc layers sandwiched together, discs must be split apart and both halves must be declassified.

Disintegration uses proven rotary knife mill technology to cut discs until the particles are so small that they cannot be reconstructed or otherwise accessed.

Shredding uses dedicated shredders that function much the same way paper shredders do. The difference is that optical media shredders are equipped to deal specifically with plastic, have modified feed openings to prevent “flyback” and special bins to eliminate static build up that typically occurs.

NSA Destruction Requirements for Optical Media

The NSA Regulation for optical media is NSA/CSS 04-02. It states that discs be reduced to a waste particle no larger than 2.2mm x 4mm. The NSA publishes a list of Evaluated Products that comply with this specification.

Choosing the Best Device for Your Needs

Usually the main criteria to determine the appropriate optical media destroyer is volume. However, other factors such as portability, no power operation, or the ability to destroy other media could be equally important.

If **volume is low**, or portability/no power required operation is a must, a **declassifier** (grinder) is a good choice. These devices reduce the data layer to 250 microns (recommended by NIST 800-88) leaving only a polycarbonate disc suitable for recycling.

If **volume is high**, (hundreds or thousands of discs at a time), a **shredder** is appropriate.

If **volume is high** or you need the ability to **destroy other media** such as USB drives, smart phones etc, choose a disintegrator or mixed media destroyer.

Helpful Resources

Video Demonstrations of Declassifiers, Mixed Media Destroyers and Optical Media Shredders: www.semshred.com/videos

NSA EPL for Optical Media Destroyers: www.semshred.com/epl



Mixed Media Destruction

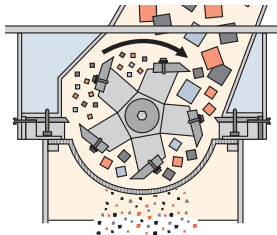
As storage media evolves, security professionals are faced with ever changing destruction challenges.

Obviously paper is easy to deal with, but what about CDs/DVDs? Cell phones? Flash memory cards? USB drives? and other media that hasn't even been dreamed up yet? When it comes to these items, a mixed media destroyer can be a versatile solution. In many cases, mixed media destroyers are actually industrial grade disintegrators that have been re-engineered to fit and operate in non-industrial work spaces.



How they work

A cutting mechanism consisting of three or five knives mounted on a steel rotor pass two stationary bed knives at speeds of up to 600 rpm, cutting material continuously until it is small enough to pass through a perforated sizing screen. Waste is removed by an external air evacuation system or in the case of smaller units, by an internal vacuum.



NSA Destruction Requirements for Mixed Media

Mixed media is a broad term and as such the destruction standards vary based on the specific items being destroyed.

Optical Media – NSA CSS 04-02 requires optical media containing Classified data to be shredded or disintegrated using an NSA/CSS evaluated optical storage device shredder per Reference c, or disintegrator per Reference d, to reduce CD and DVD storage devices into particles that have nominal edge dimensions of 5 millimeters or less and surface area of 25 square millimeters or less.

Solid State Media - disintegrate into particles that are nominally 2 millimeter edge length in size using an NSA/CSS evaluated disintegrator per Reference d. Remove all labels or markings that indicate previous use or classification.

The benefit of user selectable particle sizes

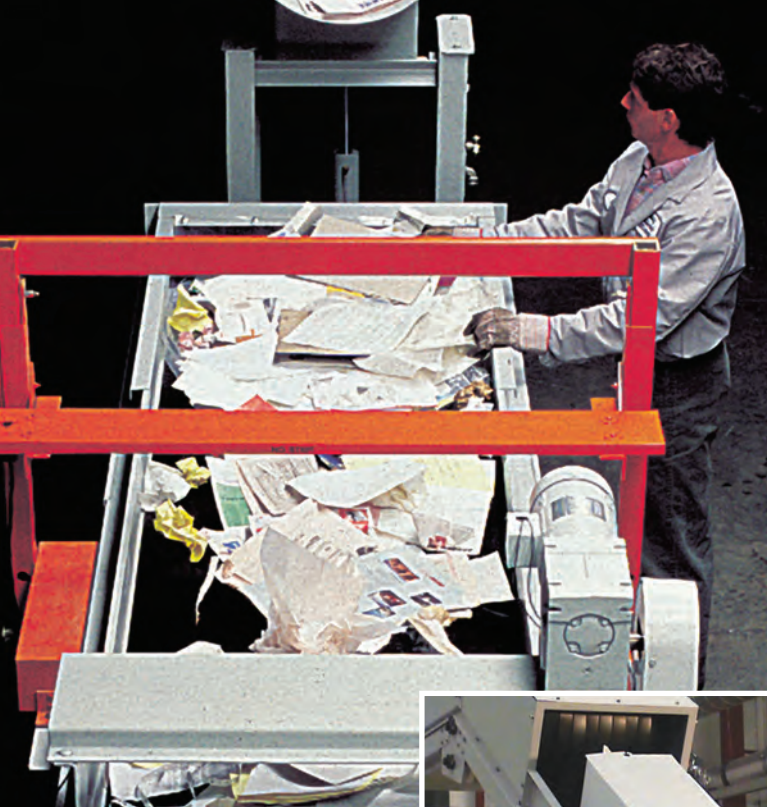
Most equipment produces a standard particle size that cannot be changed. Mixed media destroyers are actually disintegrators, so users can control waste particle size by selecting one of several available screens. Most users have more than one screen to comply with different particle size regulations.



Helpful Resources

Video Demonstrations of Mixed Media Destroyers:
www.semshred.com/videos

NSA EPL for Optical Media Destroyers: www.semshred.com/epl



High Volume Paper Destruction

Often times the volume of paper that an enterprise must shred far exceeds the capacity and capability of standard office shredders. In these instances, a central destruction system is required. Users have two basic choices for central destruction, central shredding systems or paper disintegrators.



Central Shredding Systems

Although these are technically paper shredders, they are nothing like what you would find in most offices.



Common Features of Most Central Shredding Systems

- Oversized feed openings up to 20"
- In-feed conveyors (optional take-away conveyors)
- Sheet capacities of up to several hundreds per pass
- Can destroy flat sheet, bound documents or even crumpled/crushed paper
- 208/220/460V 3-phase power
- Large motors that develop as much as 24 HP
- Convenient work platform for staging paper prior to feeding

Disintegrators

Utilizing proven rotary knife mill technology, disintegrators continuously cut paper, bound documents, burn bags and even full banker boxes into small, irregularly shaped particles that are virtually impossible to reconstruct.

Common Features of Disintegration Systems

- Thruput capacities up to 5,000lbs/hr.
- Feed opening up to 14" x 54"
- User selectable particle size
- Can destroy flat sheet, bound documents or even crumpled/crushed paper
- Can be used for more than just paper - plastic, tapes, optical media, etc.
- Evacuate waste to large bags, bins or even outside dumpsters



Helpful Resources

Video Demonstrations of High Volume Destruction Systems:
www.semshred.com/videos



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