NSA/CSS Requirements for

Solid State Disintegrators

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1 Introduction

A Solid State Disintegrator must pass an evaluation by meeting the National Security Agency/Central Security Service (NSA/CSS) requirements to destroy classified Solid State Storage Devices. Secondarily the operational, administrative, power, safety, environmental and mechanical areas will be evaluated to minimize the potential risk.

If the evaluation yields acceptable results, the NSA/CSS will include the device in the next release of the "NSA/CSS Evaluated Products List for Solid State Disintegrators." The Evaluated Products List (EPL) is meant to serve as guidance; inclusion in this document is not an endorsement by the NSA/CSS or the U.S. Government. **All listed products on the EPL sanitize Top Secret/Sensitive Compartmented Information (TS/SCI) and below.**

2 Purpose and Use

A Solid-State Disintegrator Device vendor should use this document as a guide for the NSA/CSS evaluation. For a vendor's product to be included in the "NSA/CSS Evaluated Products List for Solid State Disintegrator Device," it must satisfy all requirements in this document and go through an evaluation performed by the Center for Storage Device Sanitization Research (CSDSR). During an evaluation, the Solid-State Disintegrator will be evaluated against a random assortment of solid-state devices claims it disintegrates.

3 Definitions

- **Center for Storage Device Sanitization Research (CSDSR):** The office that guides the sanitization of information system (I.S.) storage devices for the NSA/CSS.
- **Evaluated Products Lists (EPL):** A list managed by the CSDSR that lists sanitization/destruction equipment that meets NSA/CSS specifications. These lists apply to all NSA/CSS elements and pertain to all I.S. storage devices utilized by NSA/CSS elements, contractors, and personnel.
- **Evaluator:** The destruction engineer performing the evaluation.
- **Impulse noise:** Category of (acoustic) noise that includes almost instantaneous sharp sounds.
- **Jam:** The instance of a device seizing or becoming stuck through an operation. The CSDSR considers a machine jammed when the operator must manually interfere with unjamming or resetting the device. Any automatic unjamming systems will be viewed as a part of the device's operation as long as the operator does not need to do any significant interference.
- **Operator:** The person using the solid-state disintegrator to perform the destruction of storage devices.
- **Solid State Disintegrator:** Solid State Disintegrator is defined as a machine that will reduce a Solid State Storage into small particles. Not all devices can securely disintegrate all Solid State Storage Devices.
- **Solid-State Storage Device:** Solid-state storage (SSS) is a type of computer storage media that stores data electronically and has no moving parts. SSS is made from silicon microchips. Because there are no moving parts, SSDs require less power and produce far less heat than spinning hard disk drives or magnetic tape. Besides providing faster and more consistent input/output (I/O) times, solid-state storage media offers the same data integrity and endurance levels as other electronic devices. Solid-state storage can be found generally in three form factors: solid-state drives (SSD), solid-state cards (SSC), and solid-state modules (SSM).

4 General Requirements

4.1 Destruction

The solid-state disintegrator must reduce a solid-state storage device to a maximum edge size of 2 millimeters or less (see reference a).

4.2 Operational Time

The solid-state disintegrator must operate continuously for 1 hour while destroying at least 100 various solid-state storage devices made by multiple manufacturers. The solid-state disintegrator may jam up to 3 times during the hour; however, a jam must be cleared within 5 minutes.

4.3 Solid-state storage device

A solid-state disintegrator must be able to destroy all or some of these solid-state storage devices:

- Cell phones
- Tablets
- USB/Flash/Thumb Drives
- Solid State Drives inside desktop computers and laptops
- Circuit Boards
- SIM Cards, EMV Cards, Credit Cards, and other Magnetic Strip Cards
- Optical storage devices include:
    - C.D.s
    - DVDs
    - Blu-ray

Solid-state disintegrators must be evaluated for each device type claimed by the manufacturer. Failure to meet the CSDSR requirements for any device claimed by the manufacturer will disapprove of the disintegrator.

The solid-state storage device may need to be disassembled, and only individual components will go through the destruction process (i.e., LCD, batteries, sensors, or switches removed). The vendor is required to identify any such requirements for their disintegrator.

5 Administrative Requirements

5.1 Labels

The solid-state disintegrator must have a label that can be easily viewed and includes:

- Company Name
- Model Number
- Serial Number

5.2 Feature Claims

Vendors must identify all media the disintegrator is capable of destroying in their documentation. NSAS/CSS will not test the device for media unclaimed by the vendor, nor will NSA/CSS approve untested media destruction capabilities. Failure to claim a requirement in the documentation may result in disqualification for evaluation.

5.3 User/Operator Guide

The solid-state disintegrator must have an English version of the user/operator manual. The manual must include the following:

- An accurate description of the solid-state disintegrator
- List of storage devices that the device can destroy
- An accurate summary of all features and functions
- List of specifications (i.e., power consumption, motor size, etc.)
- Operator allowed maintenance procedures that do not alter calibration:
    - Changing Filters
    - Removing a jam
    - Lubrication
    - Safety procedures

6 Power Requirements

6.1 Electronic Operation

The solid-state disintegrator will be approved for a power source that is evaluated in testing. Every power source for a solid-state disintegrator must be individually tested to claim approval.

6.2 Manual Operation Force

A manually powered destruction device must take less than 30 Newtons of force by a human operator to destroy the media.

6.3 On/Off Mechanism

The solid-state disintegrator product must have an on/off mechanism that an operator can use safely.

NOTE: If your device does not have an emergency stop mechanism, this on/off mechanism must follow all the functions outlined in the 7.1 Emergency Off section.

6.4 Power Indication

The solid-state disintegrator must have a power indicator that the operator can see.

NOTE: some devices that are not electrically powered may be excluded from this requirement.

6.5 Ready Indication

If the solid-state disintegrator requires a warm-up period before the operation, it must have a ready indication display.

7 Safety and Environmental Requirements

7.1 Emergency Off

The solid-state disintegrator product must have an emergency stop mechanism that is identified. This stopping mechanism should be initiated in a single human action and override all other functions without hindering protective functions (see reference f). The stop mechanism must be within 0.5 meters from the location where the storage media is fed into the machine for sanitization. Disengaging the emergency stop mechanism should not start the machine. The emergency procedure must be documented, which should include directions on how to reset the device.

NOTE: some devices that are not electrically powered may be excluded from this requirement.

7.2 Operator Protection

The solid-state disintegrator must protect the operator. The operator must not contact any moving parts or projectiles during the operation of the solid-state disintegrator. The disintegrator must be in an enclosed chamber that will not allow the destruction mechanism to work until a door is closed.

7.3 Air Flow

During disintegration, the solid-state storage device heats up and breaks apart, creating toxic particles, dust, and gases that could affect the operator.

All the exhausted air must go through a HEPA Filter. No dust or particulate should escape through other openings in the destruction system during operation.

7.4 Debris Collection

The solid-state disintegrator device's internal design must deposit the plastic and metal particles to a debris bin or HEPA bag. The path from the destruction chamber to the debris bin must be air-tight, and at no point should particulate or dust escape from the system.

7.5 Debris Full

The solid-state disintegrator must have a full debris indicator with automatic shut-off. This must be an actual sensor measurement of the level of debris in the bin and not based on time or other criteria.

7.6 Debris Handling

The solid-state disintegrator operator must have the ability to remove and empty the debris quickly.

7.7 Noise

Sound levels for the device must meet both the National Institute for Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA) standards (see reference b and c). CSDSR requires the sound level of devices that create impulse noise to be less than 120 dB. Machines that make continuous noise must follow Table 1 - Permissible Noise Exposures. Since operation time varies among users, the CSDSR requires the sound level of devices to be less than 85 dBA.

Table 1: Permissible Noise Exposures

Duration per day, hours	Sound level dBA slow intervals
8	90
6	92
4	95
3	97
2	100
1 ½	102
1	105
½	110
¼ or less	115

8 Mechanical Requirements

8.1 Fit and Finish

The solid-state disintegrator should have a tight fit with no gaps (greater than 2 millimeters) between panels, loose panels, faulty doors, loose windows, or sharp edges that could cause safety or operational issues.

The solid-state disintegrator should be a production unit that is complete, and all features should be operational. Special features for service engineer diagnoses are allowed but should not be available to the operator.

8.2 Vibration

The effects of vibration can be severe. Unchecked vibration can accelerate rates of wear (i.e., reduce bearing life) and damage equipment. Vibrating machinery can create noise, cause safety problems and lead to degradation in plant working conditions.

The machine must not exhibit vibration velocity in the unsatisfactory or unacceptable range shown below in Table 2. The inadequate or inappropriate differ among the four different listed machine classes:

- Class A: small machines to 15 kW
- Class B: 15-75 kW on light foundations and 15-300 kW on heavy foundations
- Class C: above 300 kW on heavy and rigid foundations
- Class D: above 300 kW on flexible foundations (soft mount).

The measurements will be taken at locations around the device using a digital vibration instrument.

Table 2: Vibration Severity

Vibration Severity						
Machine			Class A	Class B	Class C	Class D
Vibration Velocity Vms	in/s	mm/s				
	0.01	0.28				
	0.02	0.45				
	0.03	0.71				
	0.04	1.12				
	0.07	1.80				
	0.11	2.80				
	0.18	4.50				
	0.28	7.10				
	0.44	11.20				
	0.70	18.0				
	0.71	28.0				
	1.10	45.0				

Key	
Good	
Satisfactory	
Unsatisfactory	
Unacceptable	

Note: Table 2 is based on the general guidelines from International Organization for Standardization (see reference e).

8.3 Heat Generation

ASTM C1055 (the Standard Guide for Heated System Surface Conditions that Produce Contact Burn Injuries) recommends that surface temperatures remain at or below 44°C(see reference d and Table 4 below).

Table 4: Thermal Sensations and Associated Effects Throughout Range of Temperatures Compatible with Tissue Life

Sensation	Skin Color	Tissue Temperature deg. C	deg. F	Process	Injury
		deg. C	deg. F		
Numbness	White	72	162	Protein Coagulation	Irreversible
	Mottled Red and White	68		Thermal Inactivation of Tissue Contents	Possibly Reversible
		64			
		60	140		
Maximum Pain	Bright Red	56			Reversible
Severe Pain		52			
	Light Red	48			
Threshold Pain		44	111		
Hot	Flushed	40			
		36			
Warm				Normal Metabolism	None
			93		
		32			

At that temperature, the average operator can touch a 44°C surface for up to six hours without causing damage to the skin. Heat measurement will be taken in various places on each side of the machine, and no measurement should be above 44°C. Measurements will be taken inside the machine in areas that the operator has access to (e.g., empty debris, perform maintenance, resetting motors, etc.). Warning labels must be visible if the temperature in these locations can exceed 44°C. No temperature above 60°C in accessible areas will be allowed.

8.4 Calibration or Maintenance

Any machine will require calibration and maintenance during its lifetime. All required calibration or maintenance tasks performed by the operator must be safe and reasonably easy to accomplish. Some specific requirements:

- Unit jamming must be cleared within 5 minutes.
- The HEPA filter must be changed within 3 minutes without using special tools.
- Thermally-induced shutdown of a device operation must last no longer than 10 minutes to reset and permit regular operation.

9 References

a. NSA/CSS Policy Statement 9-12, "NSA/CSS Storage Device Sanitization Manual"
b. OSHA 1910.95, "Occupational noise exposure."
c. NIOSH Publication Number 98-126, "Occupational Noise Exposure"
d. ASTM C1055, "the Standard Guide for Heated System Surface Conditions that Produce Contact Burn Injuries"
e. ISO 20816, "ISO 20816 Mechanical vibration" — Measurement and evaluation of machine vibration
f. ISO 13850, Safety of machinery – Emergency Stop Function – Principles for design