

IICRC S320 Standard for Professional Assessment, Cleaning, and Restoration of Contents

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Important Definitions

Throughout this document, the terms “*shall*,” “*should*,” and “recommend” are used to compare and contrast the different levels of importance attached to certain practices and procedures.

***shall*:** When the term *shall* is used in this document, it means that the practice or procedure is mandatory due to natural law or regulatory requirement, including occupational, public health, and other relevant laws, rules, or regulations, and is, therefore, a component of the accepted “standard of care” to be followed. **To further indicate when this term is used in this document, that it carries this specific definition, it has been italicized.**

***should*:** When the term *should* is used in this document, it means that the practice or procedure is a component of the accepted “standard of care” to be followed, while not mandatory by regulatory requirements. **To further indicate when this term is used in this document, that it carries this specific definition, it has been italicized.**

recommend(ed): When the term *recommend(ed)* is used in this document, it means that the practice or procedure is advised or suggested but is not a component of the accepted “standard of care” to be followed.

In addition, the terms “may” and “can” are also available to describe referenced practices or procedures, and are defined as follows:

may: When the term *may* is used in this document, it signifies permission expressed by the document, and means that a referenced practice or procedure is permissible within the limits of this document, but is not a component of the accepted “standard of care” to be followed.

can: When the term *can* is used in this document, it signifies an ability or possibility open to a user of the document, and it means that a referenced practice or procedure is possible or capable of application but is not a component of the accepted “standard of care” to be followed.

For the practical purposes of this document, it was deemed appropriate to highlight and distinguish the critical contents restoration methods and procedures from the less critical, by characterizing the former as the “standard of care.” The IICRC S320 Consensus Body interprets the “standard of care” to be practices that are common to reasonably prudent members of the trade who are recognized in the industry as qualified and competent. Notwithstanding the foregoing, this Standard is not intended to be either exhaustive or inclusive of all pertinent requirements, methods, or procedures that might be appropriate for a particular contents restoration project.

Section A Scope, Purpose and Application

A.1 Scope

The IICRC S320 Standard defines contents (i.e., personal property) as items contained but not permanently attached to a building, or on the client's property, as distinguished from real property, or the building itself.

This Standard provides the principles, methods, and processes to assess, inventory, handle, clean, restore, remediate, preserve, and transport contents, as a result of water, mold, trauma crime scene, fire and smoke damage. This Standard also addresses contractor qualifications, administrative requirements and procedures, development of the restoration work plan (RWP), and documentation of project-related events.

This Standard does not comprehensively address:

- repair, refinishing or reupholstery of contents;
- exposures impacting occupants;
- specialized or unique industrial, manufacturing, and medical equipment;
- hazardous materials (e.g., lead, asbestos, silica, lithium-ion batteries);
- weapons, ammunition, fireworks or explosives;
- precursors, drug residues, and associated chemical waste; and
- issues occurring from situations that pose environmental hazards (e.g., chemical fires, industrial fires).

This Standard has not been written to address work related safety and health practices associated with performing professional assessment, cleaning, and restoration of contents.

A.2 Purpose

The purpose of this Standard is to describe criteria for the restorer to conduct a contents assessment and the methodologies for the inventorying, handling, cleaning, restoring, remediating, preserving, and disposal of contents after a loss event.

This Standard is not intended to be either exhaustive or inclusive of all pertinent requirements, methods, or procedures that might be appropriate on a particular restoration project. Restorers *should* use professional judgment throughout every project. A project may present unique circumstances that necessitate deviation from the Standard. Before deviating from the standard of care ("*shall*" and "*should*"), the restorer *should* document the reasons for the decision, notify the Materially Interested Parties (MIPs), and, if no timely objection is raised, record the communication before proceeding.

A.3 Application

This document is written specifically for the contents restorer and remediator. It may also serve the needs of other MIPs, including but not limited to: personal property owners, building occupants, property managers, insurance representatives, third party administrators, and anyone seeking information on how to evaluate contents and to establish or understand a Restoration Work Plan (RWP) (e.g., distributors of commercial cleaning goods, equipment and consumables; building service contractors; managers and administrators of commercial facilities; manufacturers of goods and materials of contents covered in this standard; specification writers; design engineers; building engineers; architects; consultants; inspectors; health professionals).

B Definitions and Acronyms

Absorption: the process by which the molecules, atoms, and ions enter into a bulk phase (liquid, solid, gas) of the material in which it is taken up.

Abrasive Cleaning: the use of an abrasive to remove residues without damaging the surface.

Adhered Fire Residue: fire residues that remain following light dry mechanical cleaning procedures such as dusting (lamb's wool duster or treated cloth), contact vacuuming, cellular rubber sponging, and air washing.

(Non)-Adhered Fire Residue: loose fire residues that are removed by light dry mechanical cleaning procedures (e.g., dusting [lamb's wool duster or treated cloth], contact vacuuming, cellular rubber sponging, and compressed air).

Adsorption: the adhesion of atoms, ions, or molecules from gas, liquid, or dissolved solid to a surface.

Air Filtration Device (AFD): a machine consisting of a motorized fan, filter(s), one of which is a HEPA filter, contained in a housing designed to remove airborne particulate, odor, and other contaminants from indoor air.

Authority Having Jurisdiction (AHJ): an entity that has the authority and responsibility for enforcing applicable federal, state, provincial, and local laws and regulations.

Category of Water Damage: refers to the range of contamination in water, considering both its originating source and quality after it contacts materials present on the job site. Refer to the current edition of the *ANSI/IICRC S500 Standard for Professional Water Damage Restoration* for these definitions.

Change Order: a written order to a contractor, signed by the owner or authorized agent as an addendum to a contract, authorizing a change or addition to the work.

Clean (Restoration): the absence of residues or contaminants caused by a specific incident or damage, as distinguished from pre-existing or typical conditions.

Composite Materials: material that is composed of two or more constituent materials with dissimilar physical characteristics (combined) merged to create a material with properties unlike the individual elements. (e.g., reinforced concrete, plywood, fiberglass).

Condition 1, 2, and 3: terminology related to the fungal ecology and settling of spores or actual fungal growth in an indoor environment. Refer to the current edition of the *ANSI/IICRC S520 Standard for Professional Mold Remediation*.

Containment: engineering controls used to minimize cross-contamination from affected to unaffected areas by airborne contaminants, foot traffic, or material handling.

Dry or: a cellular rubber cleaning material which, when drawn across a substrate will remove non-adhered soils by dislodging and retaining soil particles within the matrix of the rubber.

Dry Smoke Residues: fire residues characterized by dry, loose, non-smeary particles which tend to settle on horizontal surfaces. Dry smoke residue reflects an oxygen-rich fire with cellulosic materials as a primary fuel.

Engineering Controls: any process, procedure, or equipment that is utilized to reduce or eliminate cross-contamination or exposure in the work environment.

1 **Fire and Smoke Damage (FSD):** an alteration from a pre-event state that results in the loss of appearance,
2 utility, or value because of the impact of heat from fire, fire residues, and related odors on surfaces,
3 materials, and items. FSD may also include incidental damage (e.g., fire suppression activity)
4

5 **Fire Residue:** a soiling, odorous, and potentially damaging substance transported as a component of
6 smoke that deposits on or adheres to surfaces in its path of movement.
7

8 **HEPA Vacuum:** a vacuum cleaner which has been designed with a High Efficiency Particulate Air (HEPA)
9 filter as the last stage of filtration. A HEPA filter is a filter that is capable of capturing particulates of 0.3
10 microns with 99.97% efficiency.
11

12 **Incidental Damage:** in addition to direct damage resulting from loss (e.g., fire (heat) or fire residues) other
13 damage can occur at the time of the loss.
14

15 **Latent Damage:** damage not yet apparent but which may occur at a subsequent time (e.g., inherent
16 fragility, brittleness, or instability).
17

18 **Malodor:** loss-related odor that is unpleasant to the person who detects it.
19

20 **Mitigation:** actions and procedures to lessen the severity of damage and to prevent additional damage
21 (e.g., spread of contaminants) as well as secondary damage (e.g., unaddressed moisture-laden materials
22 which may begin to support microbial growth, and corrosion).
23

24 **Negative Air Device (Negative Air Machine):** a fan, blower, or AFD which creates a condition of negative
25 pressure in an enclosed space, by exhausting air to the outside of that space.
26

27 **Odor Counteractant:** any substance which mitigates a particular odor.
28

29 **Odor Management:** the application of processes, procedures, equipment, and materials used to make a
30 specific odor imperceptible or undetectable olfactorily to persons of normal sensitivity.
31

32 **Olfactory Fatigue:** prolonged exposure to odors may temporarily acclimate olfactory senses making
33 detection difficult.
34

35 **Peril:** the cause of a loss event (e.g., water, fire, smoke, mold, trauma and crime scene).
36

37 **Preserve:** to prevent or minimize damage or degradation to an item that cannot be restored (e.g., fully
38 cleaned or decontaminated, or verified to be so), which, due to monetary or sentimental value may be
39 considered irreplaceable.
40

41 **Pre-loss condition:** The condition of contents prior to exposure to loss-related conditions. This unknown
42 pre-loss condition is described by appearance, inherent odor, and overall status that existed prior to the
43 loss (e.g., wear and tear, fading, deterioration, defects, previous repairs).
44

45 **Primary damage:** damage caused by the immediate, direct impact of a peril, as opposed to secondary
46 damage, which occurs over time.
47

48 **Restorable:** when the appearance and utility of contents can be returned to pre-loss condition.
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50 **(Non) Restorable:** the integrity, appearance, and odor of a surface or material is permanently altered and
51 cannot be returned to pre-loss condition by any means.
52

53 **Restorative Cleaning:** the application of procedures designed to remove damaging residues and odors
54 from a particular surface while retaining as much of the original character as possible, often requiring the
55 use of specialized techniques and equipment.

1 **Restoration Work Plan (RWP):** a description of the work to be performed on a specific site to remedy a
2 specific condition based on direct inspection and assessment of the damage. The RWP is a component of
3 the Scope of Work.
4

5 **Restore:** the removal of damaging Unwanted Foreign Matter (UFM) or odor; to remedy damage while
6 preserving the original components, appearance, and utility to the fullest possible degree.
7

8 **Restorer:** the restoration firm, individual, contractor, or authorized representative who is responsible for
9 the restoration of damaged structures, systems, and/or contents.
10

11 **Secondary damage:** refers to the damage that occurs as a result of the initial damage but is not directly
12 caused by the initial event.
13

14 **Service Agreement (aka Work Authorization):** a document signed by a property owner or agent and
15 delivered to a contractor, requesting that the contractor perform damage repairs and accepting
16 responsibility for paying the contractor for the work.
17

18 **Spatter:** a spray, mist, or splash that has not saturated the surface it is on and is cleanable from the surface.
19

20 **Specialized Expert:** a person with knowledge, training, certification, and skills that performs functions
21 beyond the knowledge base and core skill set of the restorer, remediator, or technician.
22

23 **Surface Sampling Test:** a process used to determine the presence or absence of Unwanted Foreign
24 Matter (UFM) or loss event related odors.
25

26 **Rate and Materials (aka Time and Materials):** a method of calculating charges by recording the hours
27 worked, labor rates, material costs, and subcontractor charges, to which are added markups for overhead
28 expenses and profit.
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30 **Unwanted Foreign Matter (UFM):** Matter that deposits on, adheres to, or is absorbed by personal
31 property that is not a constituent of the item and may affect the appearance, smell, utility and value of that
32 item.
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1 Contractor Qualifications and Administrative Procedures

1.1 Education and Training

Restorers *should* be proficient in the investigation, identification, and restoration of contents loss events related to impact. Proficiency can be obtained through specialized education, training, and field experience, which includes investigation, decontamination cleaning methods, contractual and legal requirements, improving indoor environmental quality, and odor control.

Restorers can acquire requisite restoration skills through industry technical training programs, certification programs, and experience. It is recommended that restorers be familiar with current and past contents restoration methods, materials, and assemblies.

Education and training in contents identification, assessment, and restoration techniques are available through internationally recognized certification and training bodies, such as:

- Institute of Inspection, Cleaning and Restoration Certification (IICRC);
- Restoration Industry Association (RIA); and
- American Council for Accredited Certification (ACAC).

1.2 Administrative Procedures and Documentation

Materially Interested Parties (MIPs) can affect the restorer's ability to provide services or meet legal requirements, restorers *should* identify and understand the needs and expectations of the MIPs, as they relate to the project.

MIPs can include, but are not limited to:

- property owner;
- policyholder;
- insurance company;
- tenants;
- tenant's insurance company;
- Authorities Having Jurisdiction (AHJ) for environmental compliance and other regulations;
- Cause and Origin Investigators (C&O);
- Third Party Administrators (TPAs);
- Third Party Consultants (TPCs); and
- legal representative or designated agent.

It is recommended that restorers establish, implement, and consistently follow project administration methods and procedures including, but not limited to operational plans and protocols. Restoration project administration typically includes, but is not limited to:

- provide an accurate and impartial description of the contents loss event;
- use of written contracts;
- communication with involved parties;
- thorough project documentation, monitoring, and recordkeeping;
- appropriate methods to manage risk;
- ability to understand and coordinate multiple tasks and disciplines with MIPs, and
- professional and ethical practices, and business orientation.

Restorers *should* prepare accurate and comprehensive Restoration Work Plan (RWP) to address phases of the contents restoration project which *should* include, but is not limited to the following:

- damage assessment;
- mitigation services;
- source removal;
- deodorization; and
- specialty subcontracted services.

It is recommended restorers have an understanding about how property insurance may impact the restoration process, including but are not limited to:

- types of coverage;
- deductible amounts;
- policy limits;
- rights of subrogation;
- terms of payment; and
- claims handling procedures.

1.3 Licensing and Regulatory Agencies

Restorers *shall* comply with all licensing requirements set forth by the AHJ in the jurisdiction in which the services are provided.

1.4 Insurance

Restoration contractors *shall* comply with all insurance requirements established by the AHJ for each element of their operation. This includes insurance coverage for their employees, property, automobile fleet, and liability. Restorers *should* ensure that their subcontractors have appropriate insurance coverage, as required.

Restorers *should* seek the advice of an insurance professional who is familiar with their operations and can assist in developing an insurance program that includes, but is not limited to, the following:

- general liability;
- vehicles;
- umbrella or excess liability;
- workers' compensation (firms with employees);
- pollution insurance (firms that provide water mitigation with wildfire impact restoration);
- professional liability (errors and omissions);
- Bailee (firms that handle contents);
- Inland Marine (firms that handle contents);
- Cyber (firms that store private information, use credit cards, or banking info);
- property (firms that own buildings, or lease space); and
- surety bond.

1.5 Ethics

The restorer's assessment of the damage from a loss, and the associated costs of restoration services will influence the outcome of a project. Restorers *should* be truthful, impartial, and ethical at all times. Industry organizations (e.g., IICRC, RIA, or the equivalent) have written codes of ethics which restorers who perform contents restoration *should* adhere to.

1.5.1 Impartiality

Restorers *should* maintain strict impartiality in their professional opinions regarding loss events impact and its effects. Contents restorers may be subject to pressures from the client, MIPs, and other outside forces.

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Restorers *should* not be influenced or persuaded by others to alter their scope of repair or weaken their commitment to impartiality. Restorers *should* decline projects when they suspect unethical or illegal practices may occur. Refer to Section 10: Limitations, Complexities, Complications, and Conflicts (LCCCs) for additional information on disagreements between parties.

1.5.2 Transparency with Affiliations

All parties involved in loss events are entitled to a full understanding of the restorer's affiliations. The restorer *should* disclose any current or past business relationship or special arrangement that may exist with MIPs, including any ownership, discount, referral, rebate programs, other financial arrangements, or potential conflicts of interest.

1.5.3 Bias in Estimating

The restorer's description of the contents loss event and its effects *should* be accurate and impartial. In the immediate aftermath of a loss event, the perception of damage and its effects may be exaggerated by underqualified or unethical persons. A restorer minimizing the significance of contents loss-event can be equally harmful. Property owners can be influenced by opinions or technical terminology presented as facts, designed to obtain a contract, or increase the amount of a claim. A misrepresentation of facts can result in an allegation of fraud.

An understated description of damage may result in the property owner agreeing to an inadequate settlement or scope only to find that supplemental work will be required to adequately repair the impact. Restorers *should* not intentionally underestimate the scope, to obtain a contract. Understatements of impact sometimes arise from an incomplete inspection or a lack of knowledge and experience. While legitimate differences of opinion may arise over the significance of damage, the absence or presence of damage *should* be a matter of demonstrable fact.

Restorers *should* avoid offering opinions unless they are relevant to the situation and factually accurate. Experience in a particular restoration discipline does not automatically confer expertise in other areas. Opinions relating to occupancy, health, legal advice, insurance coverage, and other client concerns *should* be left to person(s) with specialized knowledge of those subjects.

1.6 Prior Damage

Contents restorers may encounter deficiencies and other prior damage which may be unrelated to the damage resulting from the loss event. Since the restorer's assessment may influence an insurance settlement, court award or tax deduction, the RWP *should* accurately address the damage resulting from the loss event.

1.7 Professional Judgement

Restorers' opinions *should* be based on their own professional judgment. Refer to Section 3: Assessment of Contents Damage and Conditions Following a Loss Event, for more information. Restoration is not always consistent with historic practices and guidelines. Alternative procedures are often available for identical conditions. Professional judgement *should* be used to provide cost-effective repair without compromising quality workmanship, the item's value, and issues relating to health and safety.

1.8 Service Agreement (Work Authorization and Contract)

Restorers *should* enter into a service agreement before performing emergency services and starting a restoration project.

Emergency work is often performed on a rate and materials basis. Non-emergency (e.g., full restoration) projects, where the restoration contractor will have provided the client with a written and priced work plan *should* require a signed work contract.

Examples of pricing methods used in restoration include, but are not limited to:

- Rate and Material - R&M (i.e., Time and Material (T&M));
- Unit Cost;
- Lump sum; and
- Hybrid.

1.9 Service Agreements - Emergency

Restorers who perform emergency services *should* have an enforceable written agreement known as an emergency work agreement prior to the commencement of work. This agreement *should* be executed by the property owner or designated agent to authorize and agree to a limited scope of services. The language of the agreement *should* include, but not be limited to the following:

- a clear explanation and understanding of the party responsible for payment;
- the scope of work (e.g., mitigate damage, stabilization services, temporary weatherproofing, prevent unauthorized intrusion);
- permission to enter the property, and to proceed with the intended work;
- terms of payment and costing method; and
- remedies for unpaid charges and associated legal fees.

1.10 Work Contracts

Non-emergency work *should* be performed with a fully executed service agreement between the restorer and the customer, or their agent. Projects vary in size and scope and can have unique issues and complications. What constitutes an adequate written contract for any given project or jurisdiction is beyond the scope of this Standard. It is recommended that restorers consult legal counsel to develop contracts. It is recommended that contracts include, but are not limited to the following, at a minimum:

- a clear identification of, and contact information for, the contracting parties;
- a description of the work to be performed, which can include reference to attached project specifications or other documents that specify the details of the work (i.e., scope of work);
- any known limitations, exclusions, assumptions, complexities or potential complications of the project;
- the project start date and projected timeframe for completion of the work;
- the price being charged for the work, and if applicable, costing methods;
- the terms and schedule for payment(s);
- change orders or variations to the contract considerations;
- warranties and disclaimer provisions, if any;
- exclusion of liability clause for consequential damage;
- the terms upon which the contract may be terminated;
- a force majeure clause; a dispute resolution clause; and
- assignment of benefits, if applicable.

1.10.1 Changes to Contracts

Substantive or material changes from the original contract *should* be documented in a written and detailed change order, which includes a description of the changes to the work, time for performance, price or fees, and method of payment. It is recommended that the customer, or the customer's designated agent, and the restorer accept the change order in writing. Change orders represent additions to, or deletions of work

1 specified in the original contract. It is recommended restorers obtain approval for any supplemental estimate
2 and/or change order work prior to commencement.

3
4 Changes to contracts may result from undiscovered conditions such as hidden or latent damage, conditions,
5 or circumstances previously unseen or unknown.

6 7 **1.10.2 Communication**

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9 Communication is critical on contents restoration projects. It is recommended that MIPs agree on the
10 purpose and subjects of project communication, the frequency and mode of communication, and with whom
11 communications will be distributed. Any Limitations, Complications, Complexities, and Conflicts (LCCC)
12 that could affect the project, *should* be discussed, documented, and distributed to the appropriate MIPs.
13 Refer to *Section 10: Limitations, Complications, Complexities and Conflicts (LCCC)* for additional
14 information.

15
16 Restorers *should* not give advice, education, or warnings on subjects outside their areas of professional
17 expertise or licensing (e.g., legal, insurance policy, engineering).

18 19 **1.10.3 Confidentiality Disclosure Agreement (CDA) or Non-Disclosure Agreement (NDA)**

20
21 Restorers *should* maintain the confidentiality of their client's affairs. The ownership and management of the
22 company performing the work *should* ensure that this principle is understood and respected by all personnel
23 involved in the project. If the client requests specific documentation to support this principle, restorers
24 *should* seek legal advice prior to signing any CDA or NDA.

25 26 **1.11 Documentation**

27 28 **1.11.1 Estimating Documentation**

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30 Relevant data *should* be obtained to the extent it will enable the restorer to calculate the cost of services,
31 regardless of the pricing method (e.g., rate and materials, unit cost, lump sum). The estimate *should* include
32 a description of the tasks to be performed on a specific site to address specific conditions identified during
33 direct inspections and assessment of the damage.

34
35 The data the restorer collects *should* reflect the nature of the work based on the pricing method. For
36 example, rate and materials pricing will require an estimated quantity of material to be used and a duration
37 of time the project will take, unit cost pricing will require site specific details (e.g., accurate measurements
38 of areas, listings of per item tasks, inventory of contents). Lump sum pricing generally requires bids from
39 subcontractors.

40 41 **1.11.2 The Restoration Work Plan (RWP)**

42
43 Following the assessment of a contents loss event, restorers *should* prepare a description of how the project
44 will be performed. Contents damage assessment will determine the affected or impacted items and the
45 severity of damage. The RWP *should* include, but is not limited to:

- 46
- 47
 - forecasting, obtaining, and managing resources;
 - 48 - establishing and maintaining engineering controls;
 - 49 - a plan for communication with the client and MIPs;
 - 50 - a written description of the work that corresponds to the particular phase of the project;
 - 51 - a schedule, or sequencing, of the order in which the services are provided;
 - 52 - a schedule of quality control inspections (e.g., visual, odor); and
 - 53 - sign offs for work completed based on pre-established acceptance criteria.
 - 54

The purpose of the RWP is to provide a sequence of work through completion of the objectives outlined in the scope of work portion of the service agreement.

1.11.3 Project Support Documentation

Documentation *should* take place at all phases of contents restoration project including, but not be limited to:

- initial assessment;
- emergency response;
- information gathering
- appearance testing;
- odor perception; and
- anticipated specialized experts, needed.

The extent of project documentation and recordkeeping varies with each restoration project. Restorers *should* record information relevant to the project over the duration of the project to protect their interests in addition to the interest of the property owner and other MIPs.

Thorough supporting project documentation and recordkeeping *should* be maintained throughout the execution and completion of a contents restoration project. This information is also valuable if there is a need to review or reconstruct the restoration process or project at some time after completion. It is also recommended that the restorer document all communications to reduce the potential of misunderstanding and miscommunication.

1.11.4 Initial Assessment Documentation

Contents loss events *should* be evaluated for safe access by a competent person prior to commencement of work. Any areas deemed unsafe to access that have been cordoned off with signage and caution tape *shall* be documented. The restorer *should* perform the site inspection and assessment of which emergency services are required as soon as possible, and the order in which they are to be performed. This assessment and list of procedures *should* be documented in the emergency phase of the RWP.

In certain circumstances, for example, when immediate emergency response is required, in lieu of a written emergency phase RWP, the direction for emergency work may be communicated verbally. It is recommended that field notes and photographs be taken at the time the services are provided, to document existing conditions and have a record of the work that was performed.

1.11.5 Information Gathering

All relevant information regarding the contents damage *should* be obtained and documented by the restorer to include, but not be limited to:

- names and contact information of all MIPs;
- information regarding the contents damage;
- information about the nature of the contents mitigation activities and methods; and
- type of mitigation.

1.11.6 Photographic Documentation

Photographs *should* be taken to document the damage to contents, as well as obvious unrelated prior damage or disrepair, when possible. The window of opportunity for this type of documentation may be limited, and therefore, *should* be prioritized. It is recommended to include photos of the exterior of the building, as well as overall pictures of areas with potential impact, prior to commencement of work.

1.11.7 Specialized Photographic Documentation

It is recommended that restorers familiarize themselves with the resources that are available to photograph building contents. Advancements in emerging technologies allow restorers to document content damages using smartphones, infrared, and 3D cameras. Many of these technologies allow the restorer to provide 360-degree digital views and in some instances can be used to complete or aid in the completion of sketch drawings and measurements.

1.11.8 Emergency Services Documentation

Restorers *should* document information about the loss and condition of contents prior to providing emergency response services. A qualified representative from the restoration company *should* inspect the contents to identify and document the priorities for mitigation.

1.11.9 Restoration Documentation for the RWP

Following any emergency work, the restorer *should* proceed with the development of the contents RWP. The restorer *should* begin to gather and maintain information; field observations, surface evaluations, reports from experts, and prepare the RWP.

1.11.10 Documenting Damage as Part of the Contents Assessment

Restorers *should* perform the necessary observations and document field data to determine the absence or presence of residues. All documented relevant information obtained by the restorer during the performance of the observations and field data *should* be utilized in the preparation of the RWP. This documented information *should* also be retained by the restorer and be used to support and defend the RWP, if necessary. The results of these observations and field data will determine the following:

- level of impact;
- disposition of contents; and
- degree of restorability.

If the building containing the contents requiring restorative services has been tested and contains hazardous materials, it is recommended the restorer confirm, verify, and record that information in the preparation of the RWP.

1.11.11 Third Party Sampling/Laboratory Analysis and Other Third Parties

In the event of a dispute regarding the presence or absence of Unwanted Foreign Matter (UFM) related to a specific event(s), it is recommended that MIPs engage the services of a qualified third party to perform sampling to be independently interpreted by a qualified and accredited laboratory. A Chain of Custody (CoC) *should* be recorded to document the custody of the sample(s) for the entire process.

Reports made available by third parties may be considered by the restoration contractor in the development of the RWP.

1.12 Other Reports and Documentation

It is recommended that the restorer be aware of and adjust to project documentation requests and requirements from MIPs. Restorers *should* be prepared to provide documentation to support the contracted tasks outlined in the RWP (e.g., rate and material labor logs, equipment usage logs). It is recommended that restorers inform MIPs that charges may be incurred for administrative time spent that is not related to the execution and completion of the RWP (e.g., detailed inventories of non-salvageable contents, photos of packed boxes confirming the box was packed to capacity, detailed floor diagrams on losses that involve only contents).

1.12.1 Documentation Retention

Records and documents *shall* be retained for a period of time following the completion of the project as dictated by the AHJ.

The documents and records obtained and maintained by the restorer *should* include, but are not limited to:

- surface testing sample results;
- project related reports made available to the restorer;
- contracts, change orders, deviations, payment schedules;
- detailed work or activity logs, including descriptions of what and when services were performed, and who performed the work or activities;
- estimates, invoices and payment receipts; and
- subcontractor estimates, invoices, and payment receipts.

1.12.2 Record Keeping for Rate and Materials (R&M) Invoices

Work performed on a rate and materials basis (e.g., emergency work, pack outs), *should* be thoroughly and accurately documented to support invoicing. Restorers *should* keep separate records for labor (time), subcontractor documentation, materials, Personal Protective Equipment (PPE), consumables, and equipment used on projects. Restorers *should* assign field project documentation responsibilities to specific, potentially dedicated people depending on the size and complexity of the project to ensure the accuracy of the documentation. This person(s) *should* also sign off on any record keeping documentation upon completion and retainage.

1.12.3 Time Keeping Documentation

Restorers *should* record the time of employees and others while actively working on the project. Projects invoiced on a rate and material basis will require such information. Time records may include, but are not limited to:

- worker name and company identification information;
- date of service;
- job title or duties;
- mobilization;
- time in and time out for a specific task;
- description for the task being performed;
- total time worked;
- verification of time by a supervisor, clerk or record keeper, and
- the signature of the worker.

The specific method of tracking, recording, and reporting time records is beyond the scope of this document. It is recommended that the restorer consult with qualified legal or accounting professionals on this issue.

1.12.4 Mobilization and Logistics

When deployment of personnel is required, contents restorers *should* maintain records of job-related costs that include time spent physically working on the project. These costs include, but are not limited to:

- travel;
- per diem;
- lodging;
- security;
- laundry;
- project management and supervision;

- specific project insurance; and
- communications.

1.12.5 Equipment, Material, PPE, and Consumables Usage Documentation

A list of equipment, materials and consumables used on a specific job *should* be created and maintained on contents restoration projects. Equipment usage logs are used to record, track, and report on the individual pieces of equipment used on a project.

An equipment usage log can include, but is not limited to:

- the function, capacity, and type of equipment; and
- the date, time, and location of the equipment, including when the equipment was put into service and removed from service.

A materials log can include, but is not limited to:

- product identity and function;
- the quantity and unit of measure of the material used (boxes, size, specialty packaging materials);
- the locations of the product usage on the project; and

A consumables log can include, but is not limited to:

- trash bags;
- single-use floor protection;
- tape and poly;
- single-use PPE; and
- equipment filters

1.13 Documentation of Limitations, Deviations, and Disclaimers

The client or customer may request or decline services that prevent the restorer from complying with the contents RWP, or the requirements and recommendations of this Standard. In these situations, it is recommended the restorer document any deviation from the workplan.

1.14 Risk Management

A risk is defined as an uncertain event or condition that, if it occurs, has a negative effect on a project's objectives. Risk is inherent on any project. Restorers *should* assess risks continually throughout the course of a project and develop a risk management plan to address them. Some examples of risks include, but are not limited to:

- safety (e.g., workers, occupants);
- legal liabilities (e.g., workmanship, property damage); and
- financial (e.g., finance project and getting paid).

Strategies to manage risk include, but are not limited to:

- avoidance (e.g., contract clauses);
- control, mitigate, modify or reduce (e.g., contract work specifications);
- accept or retain (e.g., adjust levels of liability insurance to anticipate the potential risk); and
- transfer/share (e.g., insure).

Restorers *should* seek advice from a risk management professional or refer to risk management resources for assistance in the development of a risk management plan.

2 Safety and Health

This Standard has not been written to address work related safety and health practices associated with performing professional assessment, cleaning, and restoration of contents. Restorers *shall* understand and adhere to all applicable health and safety regulations related to the country or locale in which they work. Examples of subjects addressed by regulatory requirements can include, but are not limited to:

- site specific safety surveys;
- hazard/risk assessments;
- emergency action and fire prevention plans;
- personal protective equipment;
- respiratory protection programs;
- asbestos, lead-based paint, and other regulated and hazardous materials;
- respirable crystalline silica and particulate matter;
- heat disorders and health effects;
- bloodborne pathogen exposure control plans;
- confined space work;
- written hazard communication programs (HAZCOM);
- lockout/tagout procedures and electrical safety orders;
- fall protection;
- Hearing Conservation Program (HCP);
- working surfaces (e.g., floors, ladders, scaffolds); and
- corporate health and safety plans.

Federal safety and health regulations in the United States that can impact the employees of a restoration business include, but are not limited to the Occupational Safety and Health Administration (OSHA) Standards found in Title 29 of the Code of Federal Regulations (CFR) parts 1910 and 1926:

- 29 CFR 1910 – General Industry Standards
- 29 CFR 1926 – Construction Industry Standards

Restoration firms in the United States *shall* comply with applicable sections of both the OSHA General Industry Standards and the Construction Industry Standards. Furthermore, individual state and local governments can have additional safety and health requirements that are more restrictive than Federal OSHA. Each state in the United States is required to use Federal OSHA as a minimum statutory requirement, but many states impose even more protections. Employers *shall* comply with these safety and health regulatory requirements.

3 Assessment of Contents Damage and Conditions Following a Loss Event

3.1 Introduction

Contents assessment is the process of investigating, evaluating, and information gathering regarding the nature of the loss and the extent of damage. The goal of restoration is to return contents to pre-loss condition.

The restorer *should* perform a visual assessment during the initial walk-through. Restorers *should* determine the composition of materials (e.g., wood, fabric, metal, glass) and how the porosity of those materials can affect the potential for restoration. Assessment of some contents may require surface test cleaning to determine restorability.

Restorers *shall* evaluate the presence of regulated hazardous materials (e.g., asbestos, lead) in accordance with regulations and adhere to all applicable health and safety regulations, as set by Authorities Having Jurisdiction (AHJ).

The initial assessment for the development of the Restoration Work Plan (RWP) *should* include, but not be limited to:

- coordinating with the client and Materially Interested Parties (MIPs);
- administrative procedures:
 - formalizing initial documentation (e.g., work authorizations, contracts);
 - obtaining relevant claim information, if applicable;
 - photo documentation (e.g., photographs, 3D imaging, videos); and
 - diagram/room name.
- site access concerns:
 - ingress/egress;
 - structural safety (e.g., collapsed, compromised floors, ceiling/overhead hazards);
 - environmental conditions (e.g., air quality, water, regulated contaminants, temperature extremes);
 - utilities and energy isolation (e.g., electrical, gas, battery storage);
 - security/site control (unauthorized persons, animals, law-enforcement hold); and
 - the need for emergency services (e.g., mitigation, triage, stabilization) preliminary evaluation of restorability (e.g., determine the likelihood of successful restoration, surface test cleaning).
- the need for specialized experts; and
- malodor issues.

Restorers *should* document limitations and restrictions to access contents following a loss event. Refer to *Section 5: Contents Stabilization, Mitigation, and Preservation* and *Section 10: Limitations, Complexities, Complications, and Conflicts (LCCCs)* for additional information.

3.2 Information Gathering and Client Priorities

It is recommended that the restorer requests the client identify items of particular value (e.g., sentimental, antique, monetary, artistic, historical) for the purpose of determining:

- the need for specialized experts;
- proper handling/storage techniques;
- the need for onsite protection; and
- appropriate insurance coverage.

The development of the RWP *should* include client priorities. It is recommended that restorers provide evaluations based on their training and experience in qualifying client priorities and expectations. The priorities of residential clients can differ from those of commercial clients. Influencing factors when attempting to meet the priorities of the residential client, may include, but are not limited to:

- costs of services and available funds;
- locating, cleaning, and returning important immediate needs items (e.g., clothing, documents, electronics);
- identification of important contents of sentimental, personal, and functional value;
- collectibles and high-value items identified by the client;
- identifying non-restorable items; and
- items identified by the client as unimportant, or of little value for restoration or retention.

Influencing factors when attempting to meet the priorities of the commercial client may include, but are not limited to:

- costs of services and available funds;
- locating, cleaning, and returning important immediate need items (e.g., documents, electronics);
- business interruption considerations (e.g., keeping the business open, employee retention);
- furniture and equipment (e.g., office furniture, electronics, warehousing equipment);
- inventory (e.g., saleable retail merchandise); and
- coordinating with MIPs, when required.

3.3 Initial Inspection and Restoration Triage

Restorers *should* exercise their professional judgment to perform evaluations and prioritize tasks based on several factors including, but not limited to:

- the need for mitigative treatment (e.g., drying, corrosion control);
- stabilization (e.g., electronics, textiles, artwork, documents);
- microbial growth;
- Unwanted Foreign Matter (UFM);
- UFM related odors;
- incidental or secondary damage;
- the need for specialized experts; and
- client's immediate needs (e.g., clothing, electronics, other valuables).

3.3.1 Categories of Contents

Contents *should* be categorized by their intended purpose, use, and value to the client. Categories of contents can include, but are not limited to:

- functional, purposeful, and necessary (e.g., appliances, electronics, tools);
- sentimental (e.g., family heirlooms, photographs, yearbooks);
- monetary value (e.g., jewelry, artwork, collectibles, rare wine collection);
- reusable, durable (e.g., furniture, dishes, clothing);
- disposable, non-durable (e.g., cleaning products, paper products, disposable cutlery);
- edible, ingestible, topical (e.g., food, drink, medication, health and beauty items); and
- non-functional and obsolete (e.g., electronics, appliances).

3.3.2 Damage to Contents

Restorers *should* inspect contents for conditions that result from the specific loss event. For example, conditions can be in the form of physical damage, residues, contaminants, and odors. Restorers *should*

also inspect contents for conditions that may not be directly caused by the specific loss. This damage can be described as primary, secondary, and unrelated prior damage.

Primary damage is caused by the immediate, direct impact of a loss event. Examples of primary damage can include, but are not limited to:

- staining;
- swelling;
- cupping and buckling of wood;
- delamination;
- migration of dyes;
- weakening of adhesives;
- loss-related odors;
- corrosion (e.g., flash rusting); and
- scorching or burning.

Secondary damage occurs as a result of the initial damage but is not directly caused by the loss event. Examples of secondary damage can include, but are not limited to:

- corrosion (e.g., pitting);
- discoloration;
- absorbed moisture or humidity; and
- microbial growth.

Unrelated prior damage is a condition that impairs the appearance or function of a material not related to the loss event. Examples of unrelated prior damage can include, but are not limited:

- wear and tear (e.g., scratches, gouges, dents);
- effects of age (e.g., fragility, oxidation, discoloration);
- rips, tears, and color loss (e.g., rugs, upholstery, window treatments);
- prior breakage unrelated to the loss (e.g., missing pieces, loose joints, visible glue repair);
- other sources of contamination (e.g., urine, tobacco smoke residue);
- pest and vermin activity (mice, fleas, roaches, rats, moths); and
- unrelated damage (e.g., fading from UV exposure, soot deposition from candles).

3.3.3 UFM Related Odor Inspection

During inspection, restorers *should* document the absence or presence of loss related odors in the RWP. For the purposes of quantifying the levels of detected odors during assessment, it is recommended restorers use comparative descriptive terms. These terms will allow the restorer to include the appropriate odor management protocols in the RWP.

Examples of descriptive levels of odor include, but are not limited to:

- not-detected;
- faint;
- moderate; and
- strong.

Odors can indicate the presence of UFM associated with the loss event.

Refer to *Section 9: Odor Control* for more information.

3.4 Identification and Classification of Contents

When documenting a loss, contents *should* be identified as accurately as possible by description or purpose. This Standard does not address every item or type of content that restorers may encounter on a project. However, contents can be categorized by their general or unique characteristics.

Examples of material types that may require specific restoration procedures include, but are not limited to:

- wood (e.g., finished/sealed, unfinished/unsealed, painted);
- metal (e.g., steel, brass, aluminum, copper, tin, gold, silver, platinum);
- textiles, natural and synthetic (e.g., silk, wool, nylon, cotton, polyester);
- ceramic (e.g., glazed, unglazed);
- animal hides (e.g., skins, leather, suede, furs, reptile skin);
- taxidermy;
- glass (e.g., crystal, pressed/molded, coated, etched/cut, hand-blown);
- art (e.g., oil paintings, sculpture);
- artwork on paper (e.g., photographs, lithographs, silkscreen, watercolors, pastels);
- stone (e.g., marble, granite);
- plastic (e.g., toys, vinyl, phonograph records, clear polycarbonate);
- paper (e.g., prints, books, documents, cardboard); and
- composites (see below).

It is common to encounter content items that comprise multiple materials. (e.g., wood cabinet with metal drawer pulls, leather-bound books, musical instruments, sports equipment). These items are referred to as composites.

In addition to material types, contents items can also be described by the general or unique physical characteristics of the item, including but not limited to:

- age (e.g., modern, old, antique, ancient artifacts);
- style (may be associated with a specific period in time from classical to contemporary (e.g., Queen Anne, Victorian, Art Deco);
- aesthetic or functional design (e.g., jewelry, garments); and
- quality of construction (e.g., wood joinery/dovetail/dado/fixing screws and locking cams [see figs. 1 and 2], upholstery suspension/8-way hand tied coil spring/sinuous spring [see figures 3 and 4]).
- finishes (e.g., veneer, marquetry/inlay, laminate, plating, lacquering [see figures 5 and 6]);
- finish condition (e.g., quality of the finish, presence of patina, crazing); and
- purpose (tools, sporting goods, musical instruments, electronic devices,).

3.5 Restorability of Contents

The restorer *should* use the least aggressive method that obtains a satisfactory result. The less aggressive the procedure is, the less likely any significant change from the original appearance will occur. However, to achieve satisfactory results, several procedures of progressing aggressiveness may be required to achieve the best result. If the procedure negatively alters the appearance of the object, the restorer *should* discontinue the procedure. Restorers *should* discuss and document restorability of content items with the owner and other MIPs prior to progressing to procedures that may alter the appearance.

Restorers *should* categorize contents by the level of restorability. The descriptions of levels of restorability include, but are not limited to:

- restorable: items that can be returned to pre-loss condition;
- non-restorable: items that cannot be returned to pre-loss condition;
- preservable: items that cannot be returned to pre-loss condition, but the client has requested restoration procedures be performed, to the extent possible, regardless of the outcome; and

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- preservable or repairable: items that will be handled by a specialized expert or the original manufacturer.

3.5.1 Porosity

Restorers *should* determine the porosity of the surface of materials including understanding the nature of the material impacted by the UFM. Porosity affects the ability of UFM to penetrate or remain within material which impacts the type of restoration processes that can be safely applied to obtain the desired results.

For the purposes of restorative cleaning, the porosity of materials is categorized as porous, semi-porous, and non-porous, and can be defined as:

- porous (sorber): materials allow the passage of liquids, gases, and particles through the surface with little restriction (e.g., particle board, textiles - natural and synthetic, animal hides, paper).
- semi-porous (semi-sorber): materials allow the passage of relatively smaller particles, certain liquids, or gases through material surfaces while restricting larger particles (e.g., finished cork, wood, some ceramics, treated leather); and
- non-porous (non-sorber): materials are mainly smooth surfaces that are unable to absorb liquids, gases, and particles (e.g., glass, stainless steel).

3.5.2 Test Cleaning

In certain situations, it may become necessary for restorers to perform test cleaning of contents to assist in the evaluation of UFM impact and to determine the potential for restorability. Restorers *should* perform limited on-site surface test cleaning to determine if the effects of UFM impact can be safely removed or has permanently altered the appearance of the item in question.

It is recommended that on-site test cleaning be performed using the least aggressive methods that achieve the desired results. Refer to *Section 8.4 Source Removal of UFM* for information regarding removal methodologies that can be safely performed on-site as a test. It is recommended that restorers test clean in an inconspicuous area of the content item.

Restorers may also perform surface tests to determine the presence of UFM not readily apparent by unaided vision. In the event of a dispute. Refer to *Section 1.11.12 Third Party Sampling/Laboratory Analysis and Other Third Parties*, for more information.

3.5.3 Restorer Limitations, Precautions and Engaging Specialized Experts

Restorers *should* only perform restoration procedures that are within the realm of their knowledge, training, and experience. In contents restoration, particularly when it comes to fine art or antiques, using the wrong product or procedure on an item can cause unintentional irreversible damage.

Restorers *should* engage a specialized expert for items they are not qualified to restore. Specialized experts can work with the restorer to identify and restore content items which can include, but are not limited to:

- artwork (e.g., framed art, signed pieces, authentic paintings, sculpture);
- fine jewelry
- weapons;
- sterling silver (e.g., flatware, serving pieces);
- electronics;
- antiques;
- musical instruments;
- textiles;
- taxidermy;

- clocks; and
- billiards tables and other gaming devices (e.g., pinball, slot machines).

3.6 Contents Evaluation for Specific Perils

Contents restoration processes for specific perils are included in this Standard. Perils discussed include water, mold, trauma, fire, or a combination of these. There are processes for removal of each type of UFM, as well as unique considerations that apply to the different types of peril. This Standard is not an exhaustive list of all types of UFM that a restorer may encounter.

3.7 Damage to Contents from Water and Moisture

Restorers *should* assess moisture-damaged contents as a priority when first arriving on site.

During the initial assessment, restorers *should* evaluate affected contents and determine the category of water damage to guide appropriate contents handling and restoration procedures.

Affected contents may require triage, segregation, pre-cleaning, stabilization, and controlled drying before handling or transporting especially when visibly soiled, contaminated, fragile, or at risk of secondary damage.

3.7.1 Inspection and Evaluation for Restorability

When contents are impacted by water intrusion, restorers *should* determine restorability, handling requirements, and appropriate cleaning and drying methods.

Restorers *should* evaluate damage that can result in conditions that may not be reversible by restoration procedures alone and may require repair treatments (e.g., refinishing, reupholstering). Some contents may sustain immediate damage when exposed to water or moisture and may continue to deteriorate with prolonged exposure.

Types of water damage to contents restorers may encounter, include but are not limited to:

- swelling and deformation of wood and wood composites;
- delamination of veneers;
- absorption of water into contents in contact with wet flooring;
- water spotting and staining;
- absorption due to high humidity in the air;
- blushing of wood finishes;
- warping and cupping of absorbent materials;
- rust and corrosion of metals;
- color run or bleeding of fugitive dyes; and
- saturation of cushioning materials in upholstery and bedding.

Refer to the current edition of the *ANSI/IICRC S500 Standards for Professional Water Damage Restoration* for more information.

3.7.2 Restorability Chart

Restorers *should* determine the restorability of contents based on the porosity of the items and the category of water. In general, the table below applies.

	Category 1	Category 2	Category 3
Porous	Potentially restorable	Potentially restorable	Non-restorable
Semi-porous	Generally restorable	Generally restorable	Non-restorable
Non-porous	Generally restorable	Generally restorable	Potentially restorable

Table 1: Porosity and Restorability

Content items that have been deemed non-restorable may be preservable. Refer to *Section 3.5 Restorability of Contents* for more information.

Porous and semi-porous contents affected by Category 3 water are generally non-restorable; however, clothing and other household fabrics may be restorable with submersion washing or dry solvents. Other factors that influence restorability can include but are not limited to the inability to clean all areas of saturation, staining, discoloration, and fiber damage.

Refer to *Section 3.5.3 Restorer Limitations, Precautions, and Engaging Specialized Experts* for more information on contents, that may require the use of a specialized expert.

3.8 Damage to Contents Caused by Mold

Contents from a suspected mold-contaminated environment *should* be identified as Condition 1, 2 or 3. Refer to the current edition of the *ANSI/IICRC S520 Standard for Professional Mold Remediation* for the definitions of Condition 1, 2, and 3.

As part of the preliminary determination, the restorer may have identified the following conditions without engaging in the services of an independent specialized expert:

- sufficient information was acquired to determine that Condition 1 exists throughout the structure, systems, or area, and therefore no remediation of contents is required; or
- sufficient information was acquired to determine that Condition 2 or 3 exists throughout the affected structure, systems, or area, and therefore an assumption can be made that some or all the contents are either Condition 2 or 3.

When the restorer has not acquired sufficient information to determine Condition 2 or 3 exists throughout the affected structure, systems, or area, the restorer *should* request that the client or MIPs engage an independent specialized expert to assess the contents to make the determination.

In general, the table below applies to the restorability of contents affected by mold.

	Condition 1	Condition 2	Condition 3
Porous	No action required	Potentially restorable	Non-restorable
Semi-porous	No action required	Generally restorable	Generally non-restorable
Non-porous	No action required	Generally restorable	Generally restorable

Table 2: Restorability of Contents Affected by Mold

Due to the nature of certain porous materials (e.g., books, documents, photographs, artwork), some contents may require multiple procedures to return to them Condition 1.

Refer to the current edition of the *ANSI/IICRC S520 Standard for Professional Mold Remediation* for additional information.

3.9 Damage to Contents Caused by Fire and Smoke

Restorers *should* evaluate contents based on the type of damage and the underlying surface material. Varying types of damage may require specific methods of restorative procedures to be addressed in the RWP. Examples of content evaluation based on damage include but are not limited to:

- items that require pre-cleaning before being handled;
- the degree of fire residue adhesion to the surface material;
- surface material response to the application of restoration processes (e.g., vulnerable, resilient, durable, fragile);
- items emitting very strong fire related odors;
- the need for neutralization of chemical residues (e.g., corrosion from acidic residues); and
- items that may require a specialized expert.

3.9.1 Types of Fire and Smoke Damage to Contents

Restorers *should* identify the various forms of damage resulting from fire to evaluate their effects on contents. These forms of damage include, but are not limited to:

- heat (e.g., charred, scorched, melted, delaminated, stress fractured);
- fire residue type (e.g., plastic fire, wet/dry smoke) and deposit level (e.g., light, moderate, heavy);
- intensity of fire residue odor (e.g., faint, moderate, strong);
- moisture (e.g., condensation, fire suppression efforts, plumbing failures); and
- incidental damage (e.g., building collapse, glass shards from broken windows, breakage that occurs during firefighting).

3.9.1.1 Heat Damage to Contents

Restorers *should* identify heat damage to the extent possible by visual inspection. When heavy levels of fire residues prohibit visual inspection of the surface, restorers may have to perform fire residue removal procedures to reveal effects from heat. For example, latent heat effects such as internal stress fractures in crystal and ceramic objects may compromise their structural integrity. It is recommended that restorers inform clients and other MIPs that damage to contents from heat is not removable by cleaning alone. In some situations, heat damaged contents may be repairable by a specialized expert (e.g., refinishing, reupholstering, revarnishing).

During contents assessment, restorers *should* observe potential impact of heat damage based on pressure differentials within enclosed rooms or buildings that can create unique distribution of heat and deposition patterns. Restorers frequently encounter rooms where a clear demarcation line or heat line exists. This visual anomaly is created by cooler air lower in the room and extreme heat accumulating from the ceiling downward. Contents located above this line are typically severely impacted by heat and fire residues and are generally considered non-restorable. Contents below the heat line may have greater potential for restoration. Restorers *should* document the location of the heat line (refer to Figures 1 and 2 below).



Figure 1: Heat line



Figure 2: Heat damaged contents above heat line

Refer to the current edition of the *ANSI/IICRC S700 Standard for Professional Fire and Smoke Damage Restoration* for additional information on the effects of heat on surfaces and materials.

3.9.1.2 Fire Residue Types and Levels

Fire residues and associated odors are based on the type of fuel burnt (e.g., natural, synthetic) and the rate of combustion (e.g., amount of available oxygen). It is recommended that restorers determine the nature of the residue before attempting to remove it.

Restorers *should* use descriptive terms to notate various visible levels of fire residues during Fire and Smoke Damage (FSD) assessment to assist in the development of the RWP. Following surface test cleaning procedures performed during FSD assessment, restorers *should* be able to determine whether the residues are adhered or non-adhered.

Refer to the current edition of the *ANSI/IICRC S700 Standard for Professional Fire and Smoke Damage Restoration* for additional information.

3.9.1.3 Fire Residues (Adhered and Non-Adhered)

Restorers *should* test clean surfaces and document the level of adhesion. When fire residues deposit, they can attach to surfaces by various levels of adhesion. Loosely adhered or non-adhered residues can be removed using light dry mechanical cleaning procedures (e.g., compressed air washing, lamb's wool dusting, microfiber cloths, contact vacuuming, cellular rubber sponging). Adhered fire residues are defined as residues that remain on the surface after light dry mechanical cleaning procedures. Non-adhered residues can typically be observed as black specks, or particles, which may agglomerate making them more easily seen (see Fig. 3 below). Adhered residues tend to deposit as a uniform coating where it may not be possible to discern individual particles (refer to Figure 4 below).



Figure 3: Non-adhered Fire residues



Figure 4: Adhered fire residues

3.9.1.4 Levels of Fire Residue Deposition

Fire residues deposit in greater quantities on horizontal surfaces than on vertical surfaces. This resulting condition can aid in visual inspection of the surface, particularly when objects resting on those surfaces conceal a portion of the surface below. Removal of those objects will reveal an unaffected surface which will contrast with affected surfaces allowing the restorer to describe the level of residue deposition. Restorers *should* use the following terms to describe the levels of residue impacting contents for the development of the RWP:

- Light - Fire residue particle level is low and does not obscure the underlying surface appearance. Removal of objects resting on the surface may not provide a contrast with the surrounding underlying surface area. Wiping the surface with dry absorbent media (e.g., folded paper towel, cellular rubber sponge) may be required to reveal the presence of fire residue particles;
- Moderate - Fire residue particle level is greater than in light levels. The underlying surface appearance is visible through the residue. Removal of objects can reveal a contrast with surrounding surfaces; and
- Heavy - Fire residue particle levels cover the surface such that the underlying surface appearance is not discernable. Removal of objects resting on the surface is not necessary to describe this residue level.

Regardless of the level of fire residue, the degree of adhesion that occurs between the particle (i.e., residue) and the surface material is of greater importance and *should* be documented. For example, heavy residues that are non-adhered may be more easily removed than lesser levels of adhered residues.

Refer to the current edition of the *ANSI/IICRC S700 Standard for Professional Fire and Smoke Damage Restoration*, for additional information on fire residue levels.

3.9.2 Fire Residue Odors on Contents

For purposes of quantifying the intensity levels of smoke odor detected, restorers can find it helpful to use a simple, practical, and systematic process. Using a range of comparative descriptors such as; “not detected” to “strong” may aid in the creation of the RWP that associates each level with the proposed protocol. For example, items found to have a slight odor may only require light cleaning and less aggressive odor management processes. Alternatively, items found to have strong odors may require aggressive cleaning and the use of multiple odor management processes (e.g., smoke odor counteractants, gaseous treatments). The restorer *should* apply these findings to develop the RWP.

1 The intensity of smoke odor initially encountered on a project is often an unreliable predictor of the severity
2 or persistence of lingering smoke odor. For effective smoke odor removal restorers may use multiple
3 processes and procedures.

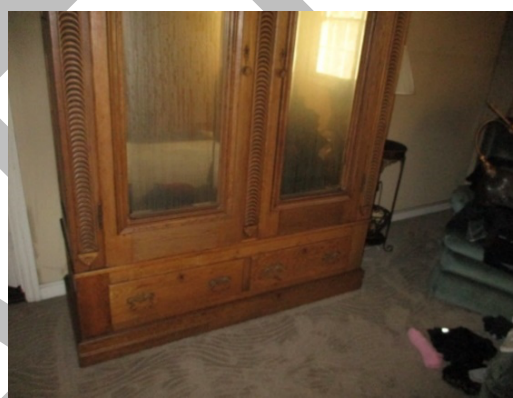
5 Refer to *Section 9: Odor Control* for additional information on fire and smoke odor management procedures.

7 3.9.3 Moisture Damage to Contents Specific to Fire

9 Restorers *should* address moisture damaged contents as a priority. While fire suppression efforts by
10 firefighting is the principal source of water, melted or broken plumbing lines, shattered plumbing fixtures
11 and damaged roofs can also contribute. Water vapor in heated air often condenses forming streaks on
12 cooler surfaces such as glass. For example, it is common for restorers to encounter condensation streaks
13 on framed art behind glass and on mirrors (refer to Figures 5 and 6).



15
16 **Figure 5: Condensation streaks on glass**



17
18 **Figure 6: Condensation streaks on mirrors**

19 Framed artwork protected by glass is particularly susceptible to moisture damage caused by water dripping
20 down the front. The glass provides a level of protection to the subject media (image) by creating a space
21 between the media (image) and the glass. Moisture dripping down the front of the glass may collect in the
22 recessed pocket of the frame which holds the glass in place. Capillary action causes the moisture to absorb
23 upwardly and into the media (image) or the mat surrounding the image.

24 Framed artwork protected by glass can be vulnerable to moisture damage when condensation forms and
25 travels down the surface of the glass. Moisture can collect within the recessed area of the frame, where the
26 glass is seated. This collected moisture may migrate through capillary action, allowing it to absorb upward
27 into the image itself or the surrounding mat. Any resulting damage *should* be documented accordingly.

28
29 Examples of the various forms of damage caused by moisture include, but are not limited to:

- 31 ▪ swelling and deformation of wood and wood composites (e.g., solid wood joinery, particle board);
- 32 ▪ raising or peeling of veneers (delamination);
- 33 ▪ absorption of water into items in contact with wet flooring (capillary action);
- 34 ▪ water spotting and staining from condensation;
- 35 ▪ blushing of wood finishes (refer to Figure 7);
- 36 ▪ warping and cupping;
- 37 ▪ rust and corrosion;
- 38 ▪ color run or bleeding; and
- 39 ▪ wetting of cushioning materials in upholstery and bedding with contaminated water.



Figure 7: Blushing on Wood Finish

Damage caused by water to contents can be permanent. Even though additional procedures may repair these forms of damage (e.g., refinishing, reupholstering), repairs of this type are beyond the scope of this standard.

Refer to the current edition of the *ANSI/IICRC S500 Standard for Professional Water Damage Restoration* for additional information on moisture damage to contents.

3.9.4 Incidental Damage to Contents

Restorers *should* inspect contents for damage resulting from efforts to control the spread of fire and smoke. In some cases, the extent of incidental damage may be far greater than the damage caused by fire and smoke-event itself. Forms of incidental damage include, but are not limited to:

- water from firefighting or sprinkler systems;
- residues from discharged fire extinguishers;
- scratches, dents, torn fabrics caused by displaced structural components (e.g., fallen drywall, plaster, insulation, broken glass); and
- breakage from emergency content manipulation (e.g., stacking wood furniture, covering with tarps).

Restorers *should* include incidental damage and address the potential for corrective action in the RWP.

Refer to current edition of the *ANSI/IICRC S700 Standard for Professional Fire and Smoke Damage Restoration* for additional information.

3.10 Damage to Contents from Trauma and Crime Scene

Trauma and crime scene events often result in the deposition of blood and bodily fluids and residues from other sources. These residues can impact contents through saturation, spatter, and surface transfer. Restorers *should* identify the extent of contamination present and the level of porosity to determine whether contents are restored, preserved, or disposed.

Contents assessment on a trauma and crime scene *should* include, but is not limited to:

- visible evidence of suspected blood, bodily fluids or Other Potential Infectious Material (OPIM);
- presence of residues from other sources (e.g., tear gas, pests, insects, maggots, fingerprint dust);
- saturation, spatter, or surface transfer of fluids or residues;
- psychological needs of the client;

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- presence and absorption of odors (e.g., putrefaction); and
- illicit drugs present or suspected.

In addition to an unaided visual inspection, restorers may use investigative methods (e.g., high intensity light, UV light, hydrogen peroxide) to detect the presence of blood and bodily fluids.

It is recommended that restorers communicate with a specialized expert regarding issues of sampling and analysis if needed.

In general, this table applies to contents contaminated by trauma and crime scene based on the level of contamination and the porosity of the content item.

	**Porous	**Semi-porous	**Nonporous
Surface Transfer	Restore	Restore	Restore
Spattered	Restore	Restore	Restore
Saturated	*Restore or Dispose	*Restore or Dispose	Restore

Table 3: Contents Restorability Based on Porosity

*Certain porous and semi-porous materials (e.g., clothing, other textiles) may be cleaned or preserved using immersion cleaning methods.

**Due to the absorption of malodors from putrefaction, regardless of porosity, affected contents are generally non-restorable.

Restorers *shall* remove, transport, and dispose of contents in accordance with the AHJ.

3.10.1 Incidental Damage to Trauma and Crime Scene Contents

Restorers *should* inspect contents for damage resulting from law enforcement activities (e.g., tear gas, glass from broken windows) and investigative materials and chemicals (e.g., fingerprint dust, tape residues). Removal of these materials and chemicals may require specific procedures. Unless properly trained, restorers *should* obtain specific removal instructions when working with tear gas residues and fingerprint dust.

Refer to the current edition of the *ANSI/IICRC S540 Standard for Trauma and Crime Scene Cleanup*, for additional information regarding trauma and crime scene.

4 Equipment, Tools, and Materials (ETM)

4.1 Introduction

As part of the development of the Restoration Work Plan (RWP), the restorer *should* identify the equipment, tools, and materials (ETM) that may be required to perform the tasks outlined therein. The amount and type of ETM to be used by the restorer on any given project will vary depending on the Unwanted Foreign Matter (UFM) impact, size, and complexity of the loss. Prior to the commencement of any services being provided, the restorer *should* have access to certain ETM and be trained in their usage to accomplish the task(s) as outlined in the RWP.

Restorers *should* know that the terms 'equipment' and 'tools' are often used interchangeably, however, for the purposes of this Standard, it is important to draw a distinction. In contents restoration, equipment is used to perform a specific task, whereas tools are usually multipurpose. In addition, as with other equipment used in restoration (e.g., drying equipment, portable generators), it is considered typical and customary for restoration contractors to charge for the use of equipment required to perform the job.

Restorers *shall* be in compliance with AHJ, regarding training and operation of ETM.

ETM that becomes contaminated by loss-related UFM *should* be cleaned, decontaminated or taken out of service.

4.1.1 Equipment

Restorers *should* have access to and working knowledge of equipment, which includes but is not limited to:

- air compressors;
- portable power generators;
- air filtration devices;
- powered machinery;
- gaseous oxidation generators (e.g., ozone, hydroxyl);
- temporary containment systems;
- air movers;
- dehumidifiers;
- vacuums (e.g., shop, HEPA);
- foggers (e.g., ULV, thermal);
- warehouse handling equipment (e.g., storage containers, forklifts, pallet jacks); and
- durable PPE (e.g., hard hats, rubber boots, re-useable full-face or half-face respirators with replaceable filter cartridges).

4.1.2 Tools

Restorers *should* have access to and working knowledge of tools which include, but are not limited to:

- pump or trigger sprayers;
- general clean up tools (e.g., shovels, brooms, dustpans, mop handles, buckets, mop wringers);
- handheld non-powered tools (e.g., hammer, screwdrivers, wrenches, pliers, prybar, utility knife, tape measure);
- handheld power tools (e.g., drill, saw) for building crates;
- hand trucks, dollies (e.g., 4-wheel, 2-wheel, appliance);
- extension cords; and
- ladders.

4.1.3 Materials

Restorers *should* have access to and working knowledge of materials which include, but are not limited to:

- cleaning products (e.g., dry mechanical, wet processes);
- odor control products (e.g., odor counteractants, adsorbent media, vapor release);
- non-reuseable containment (e.g., zippers, poly film);
- packing containers (e.g., cardboard boxes, plastic containers);
- packing materials (e.g., stretch film, paper, bubble wrap);
- protective materials (e.g., padded moving blankets);
- protective structure materials (e.g., door, door jam and floor protection);
- cleaning clothes (e.g., terry, microfiber);
- disposable poly-drop cloths and floor protection;
- trash bags;
- hazmat disposal bags and boxes;
- airtight sealable packaging (e.g., samples, preservable items);
- inventory control (e.g., labels, barcodes);
- equipment filters (e.g., pre-filters, HEPA); and
- single-use PPE (e.g., protective suits, nitrile gloves, disposable respiratory protection).

4.2 ETM Usage

The use of contents restoration ETM requires training and experience. Restorers *should* follow ETM manufacturer's instructions prior to use. Restorers *should* exercise caution and rely upon their own professional judgment while working with ETM. ETM usage, maintenance, transport, and storage *shall* conform to all safety and inspections set forth by the AHJ. Equipment and tools *should* be regularly inspected and maintained in good operating condition. Equipment and tools that have been altered, damaged, or have missing or broken parts *shall* be immediately taken out of service.

Product supplier labels, secondary labels, and Safety Data Sheets (SDSs), including information on proper disposal, *shall* be read thoroughly and understood prior to use.

Restorers *should* maintain control over how the ETM is brought onto the job site, where they will be placed, and where and how they will be stowed when not in use, if necessary, as part of providing environmental controls.

4.3 ETM Purpose and Application

Contents restorers *should* be trained in the appropriate use of ETM. Contents restorers *should* know which ETMs are commonly used on contents damage projects (e.g., moving and handling ETM, cleaning ETM). In addition to the commonly used ETM, it is recommended the restorer include any specialty ETM that will be needed on a specific job. The list of possible ETM that could be used on contents restoration projects is extensive, but not static. Product improvements and advancements in the manufacturing of ETM continue to bring innovative technology to the contents restoration industry.

4.4 Equipment Decontamination

Restorers *should* inspect, clean, and decontaminate equipment used on contents restoration projects due to the nature of the loss, level of contamination, or regulatory and safety requirements.

Equipment decontamination includes, but is not limited to:

- containment measures;

- disassembly;
- filter or cartridge replacement;
- cleaning agents;
- disinfectants;
- rinsing;
- drying; or
- documentation.

Restorers *shall* follow all regulations set forth by the AHJ, governing material use and disposal.

5 Contents Stabilization, Mitigation, and Preservation

5.1 Introduction

During the initial assessment of contents, restorers *should* determine the need to perform emergency services. If emergency services are required, they *should* commence without delay. Mitigation services that focus on addressing the individual contents directly, such as content manipulation or water extraction, if the environment is unstable, may also be necessary first to stabilize the surrounding area where the contents are located. Losses due to a specific peril may also have secondary or incidental damage that *should* be addressed.

Restorers *should* address the potential need for contents stabilization, preservation, and mitigation based on, but not limited to the following:

- prioritization of services;
- environmental factors;
- protection and preservation of contents;
- direct impact from moisture (e.g., wet contents);
- removal of gross contamination;
- ceasing the degenerative effects of certain Unwanted Foreign Matter (UFM);
- emergency odor control; and
- preventative pre-cleaning.

5.2 Pre-Mitigation Considerations

Prior to any restoration activities, restorers *shall* address conditions that can limit the mitigation work by conducting assessments as required by the AHJ (e.g., site safety survey, hazard assessment). This Standard does not address all conditions that can limit mitigation work. Examples of pre-mitigation considerations include, but are not limited to:

- potential presence of regulated hazardous materials;
- the potential presence of grossly contaminated contents;
- access to the contents;
- general worker safety (e.g., proper PPE); and
- unsafe conditions.

Restorers *should* also address conditions that may limit mitigation work including, but not limited to:

- effects from incidental damage (e.g., moisture, functional utilities);
- monetary considerations; and
- ongoing investigations by Authorities Having Jurisdiction (AHJ) or Materially Interested Parties (MIPs) (e.g., cause and origin, arson).

5.3 Prioritization of Services (Restoration Triage)

Regardless of the peril, restorers *should* prioritize emergency services on those items that require immediate mitigation. Certain contents are more vulnerable to damage caused by exposure to UFM than others. Restorers *should* exercise their professional judgment to perform on-site evaluations and make decisions on the urgency of the services based on the following factors:

- services that *should* begin immediately, when possible;
- services that are urgent *should* start as soon as resources allow; and
- services that can be deferred until practicable.

For example, contents directly impacted by moisture require immediate attention whereas light fire residues that are non-corrosive or have impacted items that are not subject to corrosion or chemical damage (i.e.,

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staining) can be performed at a later time when the appropriate restorative systems are in place. Refer to *Section 3 Assessment of Contents*, for additional information on material and surface vulnerabilities.

5.4 Environmental Factors

Contents damage frequently coincides with building damage following a loss event. Restorers *should* address the stabilization of the environment, when possible, to help stabilize contents that cannot immediately be moved. On-site stabilization procedures can include, but are not limited to:

- ventilation;
- dehumidification, heat, and air movement, when appropriate*.
- use of air filtration devices*;
- pre-cleaning;
- target demolition; and
- containment of affected areas.

*Requires electricity to be operational, which may require a temporary power supply (e.g., generators), if on-site power is not functional and cannot be restored, in a timely manner.

5.5 Protection and Preservation of Contents

In the event environmental conditions cannot be stabilized, contents *should* either be relocated to other less or non-damaged areas or removed (packed out). Stabilization and relocation of contents *should* occur before structural work begins.

Due to the significant time often required for documentation and assessment, contents including non-salvageable items may remain at the loss site for extended periods. Content manipulation offers two primary benefits:

- prevention of incidental damage from demolition and debris, during mitigation or stabilization activities; and
- improved access to building areas that require structural mitigation or stabilization, which may otherwise be obstructed by the presence of contents.

5.5.1 Incidental Damage to Contents

When restorers encounter damage to contents that are not directly related to loss events, they *should* be prepared to respond. For the purpose of this Standard, this type of damage will be referred to as incidental damage. In some cases, the extent of incidental damage can outweigh the damage caused by the loss event.

Examples of incidental damage include, but are not limited to:

- water from firefighting or sprinkler systems;
- water from plumbing failures due to heat (e.g., melted PVC pipes, soldered joints);
- residues from dry chemical fire extinguishers;
- residues from law enforcement and investigative activities (e.g., tear gas, fingerprint dust);
- structural debris (e.g., fallen drywall, insulation, broken glass, roofing materials, framing); and
- breakage from firefighting activities (e.g., stacking wood furniture, covering with tarps).

5.6 Direct Impact by Moisture

Water damage generally affects both structures and contents and in certain situations, it is difficult to address one without the other. Mitigation procedures to attempt to restore wet contents *should* commence without delay.

Contents in active water contact (e.g., dripping or standing water) *should* be immediately relocated or protected with impermeable barriers and elevated above water levels (e.g., using non-absorbent blocks). Absorptive media (e.g., cotton or paper towels) may be used to extract surface water from items with smooth finishes. Items that have absorbed moisture and cannot be dried in place, *should* be removed to a controlled environment with appropriate drying equipment (e.g., air movers, dehumidifiers). Damage to contents from exposure to moisture can include, but is not limited to:

- swelling (deformation);
- delamination (weakening of adhesives);
- blushing and white spots (milky appearance on finished wooden surfaces);
- corrosion (rust); and
- dye migration (bleeding).

Restorers *should* address the potential for damaging effects from moisture that may, or may not, be treatable. Swelling and delamination can occur quickly and is usually irreversible. The effects of blushing or white spots on wooden furniture take longer exposure time to develop but can be reversed or repaired by topical treatments or refinishing. Early detection of corrosion of metals can be reversed with the application of rust removers. Advanced corrosion or pitting of metals may cause permanent damage. Oriental wool rugs are highly susceptible to dye migration when exposed to water. It is recommended that oriental rugs be dried in manner that avoids potential dye migration. When handling area rugs, it may be necessary to consult with a specialized expert.

5.7 Addressing the Degenerative Effects of Certain UFM

Restorers *should* address the potentially damaging effects of certain UFM, as soon as possible. Some damage can occur immediately, sometimes even during the loss event. However, prolonged exposure can increase the severity of the impact. The following list are examples of the various forms of surface damage that can be exacerbated by prolonged exposure, depending on the type of UFM:

- corrosion (rust);
- staining, bleeding and discoloration (color migration, dye bleed, chemical); and
- decay (rot from fungal growth).

Depending on the peril and residue type, restorers *should* take corrective measures when at risk items have been exposed to UFM. Restorers *should* employ rust preventative procedures to mitigate corrosion of metals. Some forms of corrosion (e.g., pitting of the surface) cannot be corrected.

5.7.1 Treatments to Mitigate Corrosion

Procedures to limit the degenerative effects of certain UFM on vulnerable surfaces and materials *should* include, but are not limited to:

- application of rust inhibitor or moisture-displacing oil: Rust inhibitors and moisture displacers *should* be directly applied to vulnerable metals as an emergency treatment when the UFM are known or suspected to be corrosive (e.g., plastic fire residues). This temporary stabilization *should* be performed as soon as possible, and if the material is restorable, always be followed by thorough cleaning to neutralize the acids;
- physical removal of UFM on vulnerable surfaces: Dry mechanical and liquid cleaning processes combined with surface agitation *should* be used to remove UFM. Moderate to heavy accumulations of UFM may require more aggressive methods of removal. Regardless of the quantity of UFM, cleaning mitigation of any metallic surface *should* be performed as soon as possible following a loss event when conditions are conducive to corrosion; and
- moisture control (removal and dehumidification): removing standing water and water-saturated materials *should* be part of the emergency RWP when performing mitigation activity. Environmental controls such as ventilation and dehumidification greatly reduce the effects of acidic UFM on

vulnerable surfaces. For example, moisture-laden air can cause certain metals to flash rust. Refer to the current edition of *ANSI/IICRC S500 Standard for Professional Water Damage Restoration* for additional information about building humidity and the use of dehumidification.

Electrical components (e.g., electronics, fan motors, appliances) that have been impacted by corrosive UFM or show visible signs of corrosion after a loss event *should* be inspected by specialized experts. Refer to the current edition of the *ANSI/IICRC S700 Standard for Professional Fire and Smoke Damage Restoration* for additional information and mitigation of corrosive residues.

5.7.2 Staining, Bleeding, and Discoloration

Restorers *should* prioritize the treatment of surfaces and materials that are vulnerable to staining. In certain instances (e.g., chemical bonding of certain water or fire residues) staining can occur immediately. Restorers *should* perform test cleaning of surfaces to determine if staining can be removed or is permanent. Items with minor discoloration, but capable of cosmetic repair (e.g., repainting, reupholstery) may be deemed restorable. Stained contents that are finished surfaces and cannot accept repair or resurfacing procedures, *should* be considered non-restorable.

Contents items subject to permanent discoloration can include, but are not limited to:

- plastics (e.g., PVC, laminates, toys, sporting goods, electronic housing);
- vinyl;
- natural stone (e.g., marble, granite, travertine);
- painted furniture;
- finished wood;
- fabrics and textiles (e.g., upholstery, window treatments, clothing, rugs, carpet);
- cultured marble;
- fiberglass;
- aluminum; and
- composites.

5.8 Emergency Odor Control

Treating the entire affected space can benefit both contents and structure during emergency services. Restorers *should* evaluate the potential to employ varying forms of odor management that can provide relief for occupants until full and thorough restorative cleaning and odor management can be performed. Examples of emergency odor management procedures include, but are not limited to:

- ventilation;
- use of AFDs (i.e., air scrubbers) equipped with an adsorbent media filtration stage;
- limited and selective source removal (e.g., demolition of charred materials, non-salvageable contents);
- fogging the affected area (e.g., ULV, thermal);
- saturation spraying of odor counteractants on odorous surfaces and materials;
- installation of containment barriers around heavily damaged and highly malodorous building surfaces and contents; and
- oxidizing treatments.

Refer to *Section 9 Odor Control*, for more information.

5.9 Emergency Mitigation Cleaning

Mitigation cleaning by gentle dry mechanical removal (e.g., dusting, cellular rubber sponging, brushing) on the exposed surfaces of vulnerable contents *should* be performed prior to manipulation, to prevent incidental damage (e.g., staining, smearing) by handling. For example, preparation for handling procedures

1 such as wrapping in stretch film or padded furniture blankets may further damage the object by forcing UFM
2 deeper into an absorbent (porous or semi-porous) surface. Preventative efforts can provide the restorer
3 with a much higher likelihood of achieving satisfactory results during full restoration processes.

4
5 It is recommended that restorers wear gloves (e.g., nitrile, cotton) when handling affected contents, to
6 minimize residue transfer and staining from body oils.

7 8 **5.10 Outdoor Contents Mitigation and Stabilization**

9
10 It is recommended that when cleaning grossly contaminated contents outdoors, restorers *should* maintain a distance
11 from buildings, air intakes, and unprotected people that allows for adequate dispersal of released contaminants.

12 13 **5.11 Waste Material Handling and Disposal**

14
15 Restorers *should* remove waste from the work area in a manner that minimizes the risk of cross-
16 contamination and occupant or worker exposure. It is recommended that restorers package waste in bags
17 or material that is resistant to rips, tears, punctures.

18
19 When grossly contaminated contents or waste materials are removed from the contaminated work area,
20 packaging *should* be securely sealed. The exterior surfaces of the packaging *should* be cleaned and
21 decontaminated prior to removal from the contaminated area or decontamination chamber.

22
23 When timely disposal of contaminated contents and waste materials is not practical, restorers *should*
24 store waste material in a secure location. Restorers *shall* follow guidelines set by the AHJ, when
25 disposing of contaminated waste materials and contents.

6 Contents Inventory

6.1 Introduction

Restorers *should* create a comprehensive inventory prior to contents being handled, relocated, or removed. Photo documentation *should* include images of contents in their current condition and original location within the property.

To ensure accuracy of the inventory is completed, it is recommended that restorers take photographs at the start and end of each day.

6.2 Inventory Documentation

Restorers *should* implement the inventory method that best fits the circumstances of the loss event.

Types of inventories that can be performed include, but are not limited to:

- written (e.g., handwritten);
- photographic documentation (e.g., photos, 3-D imaging, videos);
- voice recording;
- speech to text transcription; and
- digital (e.g., software based).

When providing photographic documentation, restorers *should* take as many photos as necessary to accurately capture the condition of an item, and include their identifying information, quality, and condition. Sentimental and valued items identified by the client (e.g., scheduled items, artwork, and collectibles) may require additional documentation.

Images *should* include, but not be limited to:

- damage related to a loss event;
- photos of items showing their original location;
- full view of the item from various angles;
- general condition of the items (e.g., prior damage issues, stains, wear and tear, previous repairs);
- brand, model, and serial number, if applicable;
- unique characteristics (e.g., dovetail joints, inlays, inscriptions);
- brand and makers' marks;
- quantity of items (e.g., multiples of glassware, dishes, flatware, books).

Conditions that are not able to be captured in a photo *should* be noted (e.g., loose table leg, oily film, locked box).

Restorers *should* provide clients with copies of the inventory documentation and request a documentable acknowledgement of receipt. Restorers *should* retain this documentation in the event they will need to support or defend concerns from Materially Interested Parties (MIPs). A copy of the inventory *should* be retained with the job records.

6.3 Type of Inventory

Types of inventories that can be completed include, but are not limited to:

- on-site storage;
- pack out (for processing or storage);
- non-restorable inventory; and
- textiles.

6.4 Inventory Process

Restorers *should* label each room and inventory the contents of the room before moving to another location on the property. It is recommended that restorers leave non-restorable contents in the room they came from or move them to a central location on-site (e.g., garage, porch, living room). Refer to *Section 7 Contents Pack-Out* for more information on packing contents.

6.4.1 Inventory of Boxed Contents

For condition issues as well as accountability purposes, it is recommended that restorers photograph the contents that will be packed in a box for handling (e.g., transit, off-site processing if indicated, and storage). Restorers *should* assign general descriptions of boxed items (e.g., dishes, glassware, utensils, books, decorative items, pictures) for identification of items packed in boxes.

Restorers *should* create a method of identification (e.g., pre-printed, handwritten) to be assigned to boxed contents. Identification data can include, but is not limited to:

- customer name;
- item description;
- item location;
- inventory number; and
- packed or inventoried by ID.

To facilitate the inventory process, it is recommended restorers box like items together and sort boxed items according to their disposition (e.g., cleaning, storage, disposal, preserve).

6.4.1.1 Contents Packed by Others (PBO)

Restorers can encounter contents that have been stowed in containers (e.g., cardboard boxes, plastic bins) by someone other than the restorer. These containers *should* be documented on the inventory as Packed by Others (PBO), meaning the contents and conditions are unknown and no additional documentation is required. If the contents of PBO containers are potentially contaminated, restorers *should* inspect the contents to determine the need for UFM removal and deodorization.

It is recommended that restorers inspect the contents of PBO containers to determine whether those items are safe for handling. If the contents of a PBO are deemed unsafe for handling, restorers *should* unpack the PBO and re-pack the contents in such a way that are safe for handling.

PBO containers re-packed by restorers *should* be inventoried as described in *Section 6.4.1 Inventory and Boxed Contents* and no longer referred to as PBO.

6.4.2 Inventory of Non-boxed Contents

Individual standalone items (e.g., furniture, large tools, major appliances) that require manipulation *should* be documented including a general description of the items and photo documentation of individual items accompanied by descriptive notations for event and non-event condition issues. Restorers *should* include manufacturer's information about the item (e.g., make, model, serial number) when available.

6.4.3 Non-Restorable Inventory

Restorers may be tasked (hired by the owner, insurance carrier, or other MIPs) with creating an inventory of items which have been determined through damage assessment to be non-restorable. These items *should* be photo documented and described as accurately as possible to include, but not be limited to, the following information:

- location of the items;
- description of the items;
- brand, model number, and serial number (if applicable); and
- quantity of items.

Some items that are not restorable may be preserved or salvaged at the discretion of the client. The damage to contents can prevent complete documentation of that item. In this situation, it is recommended that restorers refer to the client or a specialized expert.

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7 Contents Pack Out

7.1 Introduction

Pack outs may be performed for the removal of contents for entire buildings, portions of contents in the building, or a particular class of items or individual item(s). The decision to remove the contents *should* be agreed to by the client and all other Materially Interested Parties (MIPs). Restoration contractors *should* base the decision to remove the contents from the loss site by evaluating site conditions that include but are not limited to:

- onsite safety;
- substantial damage to the building (e.g., the presence of contents impedes structural repairs, potential risk of additional damage if the contents are left in place);
- jobsite conditions (e.g., utilities are not functional, lack of environmental controls, unstable/unsecured building, presence of regulated hazardous materials, high levels of humidity);
- severity of damage (e.g., heavy concentrations of residues and odors are present on contents);
- cost effectiveness (e.g., available funds to pay for these services may be limited, the cost of these services may exceed the value of the personal property); and
- construction method of items (e.g., furniture assembled in place, particle board, locking cams and fixing screws).

It is recommended restoration contractors who perform partial and complete pack outs have, or have access to, facilities with adequate space to process and, if needed, store client property. Contents to be packed out *should* be accurately described, photographed, and inventoried to document exactly what was removed, where it was located, and the condition it was in at the time it was removed, including any pre-loss condition issues. It is recommended that restoration contractors who perform pack outs also use computer-based programs to track the contents throughout the process (e.g., barcoding, printable spreadsheets).

7.1.1 Psychology and Pack Outs

The decision to pack out a building can be an indicator of the severity of the loss resulting in significant damage to both the building and the contents. A severe loss can also negatively impact the property owner's emotional wellbeing (e.g., personal injury, loss of life, loss of sentimental items, family heirlooms).

It is recommended that restorers be honest, sincere, and empathetic when discussing the degree of restorability that restoration processes can provide to damaged contents, especially those of sentimental value. In situations where the client is faced with severe damage to sentimental items, they may prefer any level of improvement over none at all. Refer to *Section 3.5 Restorability of Contents* for information on preservable contents. Restorers *should* provide the client with a clear, cost-effective, and itemized plan for recovery and restoration of damaged contents.

7.1.2 The Pack Out Crew

It is recommended that restorers who perform pack outs train employees on the proper inventorying and handling of contents. Restorers who perform the work *should* be adequately prepared with supplies and equipment (e.g., PPE, portable generators, temporary lighting, potable water, temporary toilet, portable heating/cooling machines) when performing pack outs in poor environmental conditions. Some examples of poor environmental conditions include:

- the presence of suspended fire residues;
- off gassing of VOCs;
- category 3 water, condition 3 mold damage;
- the presence of blood or other bodily fluids;
- extreme temperatures (e.g., hot and cold);

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- lack of functioning utilities (e.g., electric, plumbing);
- poor lighting; and
- the presence of compromised structural components and debris (e.g., fallen drywall, insulation, collapsed flooring).

Restorers who train employees to perform pack outs *should* apply the requisite skills, technical knowledge, and experience from the restoration cleaning and handling of contents to identify problematic issues with contents that may have not been identified during the initial assessment.

The crew performing the pack out *should* include a working restoration supervisor for the duration of the pack out to manage the project. This supervisor's management responsibilities may include, but are not limited to:

- be the primary source of communication with the client;
- answer specific job-related questions from the client;
- make final decisions on restorability of contents (e.g., what to and what not to take for restoration, what may require the services of a specialized expert); and
- to alert the restoration company when potential problems arise (e.g., Limitations, Complexities, Complications, and Conflicts (LCCCs)).

It is recommended that technicians assisting with the pack out, redirect project-related questions from clients to the on-site supervisor. This includes making decisions and solving problems.

The restoration pack out crew *should* operate in a professional manner at all times. This includes being respectful of the property of others, particularly in severe losses (e.g., roof has burnt off, ceilings collapsed, extreme water damage) where much of the personal property is not salvageable.

7.1.3 Pack Out Considerations

Restorers *should* explain to clients and MIPs that contents handling charges are often calculated on a labor and material basis and that providing an accurate cost estimate may not be possible. It is recommended that when restorers are providing estimates for pack outs, they make it clear to the client and MIPs that an estimate is exactly that, and not a true reflection of the actual costs of performing all phases of a pack out project, because of unknown variables.

Restorers *should* be aware that the possibility exists where the financial impact of the loss exceeds the amount of funds available for the restoration and repair of contents. In this event, the restorers *should* discuss options with the client so that the client may prioritize services (i.e., accept the services they want the restoration contractor to perform and services they decline. Restorers *should* document the client's decisions before proceeding.

7.2 Removal of Personal Property

Restorers *should* protect and safeguard client property when removing contents for off-site processing. Protection includes prevention of breakage from handling and inventory controls. It is recommended that restorers utilize tracking software (e.g., barcodes, spreadsheets) to track the property of their clients from the moment it leaves the property until its return. Restorers *should* photo document the condition of all items prior to any content restoration activities and supplement with written notes, as needed. It is recommended that restorers protect the building itself during the move by utilizing protective padding (e.g., furniture moving pads) on doors, door openings (e.g., trim casing), banister, and rails. Restorers *should* identify potential hazards and concerns that may arise if precautionary and accountability systems are not in place, such as:

- damage to items from handling (i.e., breakage);
- damage to the structure (e.g., door, door casings, banisters and rails);
- delivering another client's property to the intended client; and

- losing an item(s).

7.2.1 Consolidation of Contents in Preparation for Moving (Packing)

It is recommended that restorers utilize cardboard boxes or other similar containers to consolidate smaller and fragile items of personal property to increase the efficiency of the removal process. In order to limit damage or prevent misplacement of an item, if the item can fit into a box, even one that has to be customized, it *should* be packed, transported, and stored in a box.

Fragile items that may become damaged in transit *should* be individually wrapped to prevent damage from moving in packing paper (unprinted newsprint), tissue or bubble wrap before placement into the box. Moving boxes are available in a variety of sizes that restorers may utilize to maximize efficiency while packing. It is not recommended to pack only one item per box unless that item is fragile, of high value, or heavy. Restorers *should* load items into boxes in a manner to prevent damage (e.g., heavier and larger items *should* be on the bottom of the box). Boxes containing anything breakable *should* be filled with a layer(s) of cushioning paper on the bottom before adding the contents and again on the top before closing the box. This will prevent excessive shifting and offer some level of protection from accidental droppings or becoming crushed due to stacking. Wrapped plates and dishes, with protection between them, *should* be stacked on their edges and glass resting on their bases. Restorers *should* wear gloves while packing.

Restorers *should* avoid touching the image area of artwork. It is recommended that framed art be handled by the frame or edges. It is recommended that no packing materials come in contact with the image. With framed art restorers may use sheets of cardboard resting on the front of the frame and held in place by stretch film to protect the image. Wall art that is not protected by glass (e.g., paintings, mixed media) that are too large for conventional moving boxes *should* be packed into flat boxes, described in the moving industry as “mirror cartons”. These boxes provide space to include protective wrapping for wall hangings (e.g., multi-ply kraft paper, bubble wrap, foam sheets).

Custom wooden crates or similar sturdy containers *should* be designed and constructed to safely hold large mirrors, large glass tabletops, marble tops to furniture and other objects (e.g., crystal chandeliers) that are too heavy or too fragile to risk putting them in cardboard boxes. Heavy and large breakable items (e.g., glass dining tabletops, marble furniture tops, full-length mirrors) *should* be wrapped in protective materials prior to being crated.

7.2.2 Handling Hard Furniture (Wood and Metal)

Wood furniture *should* be prepped for moving by wrapping in protective pads and held in place with tape, elastic moving bands or stretch wrap. The pads *should* be quilted and of sufficient density and cushioning to perform their intended purpose of protecting the furniture and interior walls and door casings. Restorers *should* use high-quality moving pads and maintain them by washing after each use to prevent cross contamination. Restorers *should* avoid blankets which may have been dyed as the dye may transfer onto the piece due to certain environmental conditions (e.g., high temperatures, high humidity).

When moving furniture with drawers, doors, or multiple components (e.g., table legs, bed slats), it is recommended that restorers use stretch film to keep drawers in place, cabinet doors from opening, consolidation of furniture with numerous pieces (e.g., bed rails and slats) while being carried. Restorers *should* not allow stretch film to come in contact with the finished surface. Moving blankets that are smooth and not quilted *should* be used on tabletops (e.g., dining tables) as a first layer of protection. Quilted pads can leave their stitching pattern impression on finishes that have been softened by frequent polishing with silicone-based aerosol polishes, particularly if other items are stacked upon it.

Furniture legs *should* be removed when possible and wrapped separately. Restorers *should* not push or drag furniture without the use of protective sliders, particularly furniture with legs. Furniture legs have little resistance to lateral stress. Tables *should* be lifted by the apron, when present, not by the top. Drawer, doorknobs, and pulls *should* be removed or reversed so that the knob or pull does not break off while

handling. Glass on wood furniture (e.g., China cabinet, curio cabinet doors) *should* be covered with cardboard and affixed to the piece with stretch film, not tape, prior to wrapping in protective pads or blankets. Any hardware removed from furniture *should* be bagged, tagged (i.e., labeled) and safely stored for reuse. It is not recommended that restorers use adhesive identification/inventory tags on wood or metal items which may damage the finish. In addition, the adhesive may not securely adhere to surfaces coated with a layer of fire residues, particularly oily or greasy residues. It is recommended that restorers use non-adhesive tags that can be affixed to items safely and securely (e.g., manilla tags, plastic coated wire) that can easily be removed during cleaning procedures then re-attached.

7.2.3 Soft Furniture (Upholstery and Bedding)

Before moving skirted upholstered furniture, restorers *should* fold the skirts upward and secure them to the body of the piece with stretch film. Grasping the underside of the piece through the skirt to move it can cause permanent impressions in some fabrics. Restorers *should* not use quilted moving pads on genuine leather upholstery. As with the dining table example above, the quilting stitch pattern can easily be transferred to the leather. It is recommended that restorers use moving pads, not stretch film (i.e., encapsulation), to protect the tops and bottoms of upholstery.

It is recommended that restorers first wrap mattresses in plastic (e.g., poly, stretch film) and be placed in cardboard boxes, when possible. Mattress construction allows for the mattress to be gently compressed to move them in and out of doorways and stairwells. Excessive bending can damage the mattress.

7.3 Warehouse/Plant Management of Removed Goods

Restorers *should* utilize inventory control (e.g., barcodes, printable spreadsheets) so that client property can be tracked from the moment it leaves the loss site to the time it is returned. This form of trackable identification *should* be initiated prior to its removal from the loss site. Restorers *should* create identifiable locations within their facility where the property of clients will be held. It is recommended the restorer tracks the client's property any time the location of the property changes, for any reason. The following are examples of changes of locations that may occur in a typical pack out:

- receiving goods at a restorer facility;
- placement into identified storage location awaiting processing;
- brought from storage location to processing area(s);
- return to storage location after processing; and
- release of goods in storage to delivery truck.

It is recommended that restorers establish and maintain recordkeeping systems for the labor hours and equipment used while manipulating and processing the contents within the facility to include, but not be limited to:

- mobilization;
- moving, packing, unpacking;
- transit;
- cleaning and repacking;
- partial deliveries of special requests by clients;
- client inspections at the restorer's facility;
- access by specialized experts; and
- decontamination of equipment and materials (e.g., moving pads, crates, trucks).

7.3.1 Contents Storage

Restorers *should* be capable of providing a secure, supervised facility with a stable environment, in which to store the personal property of their clients. Restorers that have multiple pack outs stored in their facility,

1 *should* keep each client's property separated from other clients' property. To prevent cross contamination
2 restorers *should* separate restored contents from non-restored contents.
3

4 It is recommended that the storage facility be equipped with short-term storage capabilities (e.g., moveable
5 storage containers, racked shelving) and the necessary equipment to safely manipulate the contents within
6 the facility to facilitate cleaning, odor management, staging, etc. (e.g., forklifts, pallet jacks). It is
7 recommended that contents manipulation within the processing facility be documented for potential charges
8 the client will be expected to pay (e.g., putting contents into temporary storage locations, retrieving items
9 from storage locations for restoration processes).
10

11 Storage facilities *should* be organized to allow items to be located and retrieved on reasonable advanced
12 notice. Restorers *should* notify the client and, in certain situations, the MIPs when additional labor charges
13 are to be incurred to facilitate locating and retrieving items of personal property (e.g., partial delivery, staging
14 items for in-plant inspection, order of delivery).
15

16 Restorers *shall* follow all applicable storage regulations set forth by the AHJ.
17

18 **7.4 Return of Contents (Delivery/Pack Back)** 19

20 Restorers *should* provide documented evidence that all items in their care and custody have been loaded
21 onto the truck for delivery. Providing this documentation to the client upon delivery allows the client to review
22 the list to confirm that all the contents have been received. Restorers *should* obtain a signed
23 acknowledgement of receipt for goods from the client at the time of delivery. It is recommended that this
24 documentation be made available to MIPs and accompany invoicing to the party responsible for payment.
25

26 It is recommended restorers prepare buildings to accept the delivery of restored contents by installing
27 protective materials on vulnerable flooring surfaces (e.g., carpeting, new or newly refinished wood flooring),
28 stairs and other high traffic areas. It is recommended that doors, door casings, banisters and railings be
29 covered by protective pads (e.g., quilted moving pads) to prevent damage from furniture being manipulated
30 within the building.
31

32 It is recommended that restorers use the photographic documentation taken during pack-out showing the
33 location where contents were located within the building so that they can be returned to those locations
34 upon delivery, where applicable. It is recommended that furniture that was disassembled to be removed be
35 re-assembled upon delivery, if this service is within the skill set of the restorer. Some re-assembly of
36 furniture may require the use of specialized experts. It is recommended that unpacking and placement of
37 boxed contents be offered to the client and documented when declined. If requested by the client or MIPs,
38 the restorer *should* provide the projected costs for unpacking prior to providing that service.
39

40 **7.5 Disposal of Non-Restorable Items** 41

42 Restorers *should* obtain written disposal authorization from the property owner or their designated agent
43 prior to removal and disposal. This authorization *should* specifically address the items designated for
44 disposal (i.e., per room, per item) and include a place for the owner to list any exceptions, if necessary. It
45 is recommended that items determined to be non-restorable and that have been properly documented be
46 removed from the loss site as soon as practical, so as not to impede other restoration work (e.g., demolition,
47 structural cleaning).
48

49 Property designated for disposal *should* not be sold, donated, or diverted to other use unless so directed
50 by written instruction by the property owner or agent. Personal property designated for disposal *shall* be
51 disposed of in a manner in compliance with the AHJ. When the insurance carrier is compensating the
52 property owner for the non-salvageable property, the damaged item(s) may be considered the property of
53 the insurer, who may authorize disposal or retention.
54
55

7.6 Disposal and Waste Material Handling

Restorers *should* move waste from the work area to the waste container in a manner that minimizes the possibility of cross-contamination or occupant or worker exposure. Mold-contaminated contents that are being disposed of *should* be handled and removed carefully. It is recommended that restorers package the waste in bags or material that is durable and resistant to rips, tears, and punctures, unless contents are disposed directly through a waste-out tunnel or transfer system. Packaging *should* be sealed and then properly cleaned or double wrapped, prior to being removed from the contaminated area or decontamination chamber. If bagged or wrapped disposal materials rupture outside the containment but within the exit pathway, contain the debris and clean the impacted area accordingly.

If timely disposal of contaminated contents is not practical, restorers *should* store waste material in a secure location. Restorers *shall* follow federal, state, provincial, and local disposal laws and regulations. In most jurisdictions, mold specific waste disposal provisions do not exist, and *should* not be labeled as a biohazard.

8 Contents Cleaning and Restoration

8.1 Introduction

Restorative cleaning processes are designed to remove Unwanted Foreign Matter (UFM) and odors from a surface while retaining as many of the original characteristics as possible. Contents items are unique and may not always be able to be restored by the removal methods described herein. The use of specialized experts may be required.

Restorers *should* assess the impact of the damage to contents, before developing a Restoration Work Plan (RWP), which may include cleaning, restoration, preservation, and disposal of contents. Restoration of contents can either be performed on-site or off-site depending on worksite conditions.

When cleaning methods include chemicals, restorers *shall* comply with the AHJ. If a client requests the product label or Safety Data Sheet (SDS) of the cleaning agent, the restorer *shall* provide it.

8.2 On-site and Off-site Restoration

Restorers *should* determine whether restoration will take place on-site, off-site, or a combination of both. It is recommended restorers consider the following, including but not limited to:

- quantity of impacted contents;
- environmental conditions;
- availability of utilities;
- value of contents;
- equipment, tools, and materials;
- security concerns;
- duration of restoration;
- demolition and reconstruction activities;
- amount of temporary storage or relocation space;
- ease of moving (e.g., gym equipment, pool table); and
- available space on-site.

8.2.1 Surface Material Evaluations

Restorers *should* evaluate the surface material of the item impacted by UFM before attempting a removal procedure. The nature of certain materials and assemblies can influence the method and application of source removal processes, or whether the items can even accept restoration procedures. The construction, composition, and condition of the content items *should* be determined before deciding which restoration processes can be applied. These factors *should* include, but are not limited to:

- porosity (e.g., porous, semi-porous, non-porous);
- materials composition (e.g., natural, synthetic, combination of both);
- fragility - (e.g., adequate stability necessary for restoration processes);
- finish (e.g., lacquered brass, black lacquer, shellac, urethane);
- signs of corrosion (e.g. rust, pitting, etching);
- construction (e.g., glued, stapled; mechanically attached);
- pre-loss condition (e.g., stained, worn, scratched);
- age (e.g., patina); and
- secondary damage (e.g., microbiological growth, accelerated corrosion, further damage from prolonged exposure to UFM).

1 It is recommended that the least aggressive restorative procedures be used before attempting more
2 aggressive procedures. It is recommended that the restorer test cleaning processes in an inconspicuous
3 place, if possible.

4 5 **8.3 Use of Specialized Experts**

6
7 It is recommended that restorers refer items they are not qualified to restore to specialized experts.
8 Examples of contents that may require the services of specialized experts can include, but are not limited
9 to:

- 10
- 11 ▪ fine and decorative arts and jewelry;
- 12 ▪ firearms;
- 13 ▪ electronics, appliances, and machinery;
- 14 ▪ data recovery;
- 15 ▪ antique and period furniture;
- 16 ▪ pool tables;
- 17 ▪ area rugs; and
- 18 ▪ window treatments.
- 19

20 **8.4 Source Removal of UFM**

21
22 UFM residues on materials, items, and surfaces *should* be evaluated based on the characteristics of the
23 contents and the vulnerabilities of the surfaces beneath the UFM. Source removal cleaning procedures can
24 also remove underlying and unrelated residues (soil). Restorers *should* use caution to preserve the existing
25 patina, a desirable discoloration on metals, leathers, and wooden finishes that develop due to oxidation and
26 use over time. Restorers *should* discuss proposed methods of UFM source removal with the property owner
27 before proceeding and risking the removal of the patina, possibly diminishing the items' value.

28
29 UFM removal methods fall into two categories: dry mechanical action and liquid (wet) processes. In some
30 situations, a single removal procedure may achieve the desired result (e.g., dry mechanical action). In other
31 situations, full restoration of contents may require a combination of restorative procedures (e.g., dry
32 mechanical action combined with liquid processes).

33 34 **8.4.1 Dry Mechanical Processes**

35
36 Restorers *should* apply the least aggressive dry mechanical restorative procedure that provides the desired
37 result and does not adversely affect the underlying surface. More aggressive dry mechanical procedures
38 can alter the surface or appearance creating the need for additional restoration or repair.

39
40 Examples of dry mechanical methods include, but are not limited to:

- 41
- 42 ▪ compressed air <30 PSI;
- 43 ▪ dusting tools (e.g., lamb's wool duster, feather duster, microfiber cloths);
- 44 ▪ HEPA vacuum with appropriate attachments;
- 45 ▪ roller brush (e.g., sticky tape);
- 46 ▪ cellular rubber sponge; or
- 47 ▪ steel wool, abrasive pads.
- 48

49 **8.4.2 Liquid (Wet) Processes**

50
51 Use of liquid cleaning processes *should* be performed after evaluation of the target surface material. Liquid
52 process can involve the use of detergents and other cleaners that may be aqueous (e.g., water based) and
53 non-aqueous (e.g., odorless mineral spirits, alcohol). Restorers *should* follow manufacturer's instructions
54 for dilution ratios and application rates. When using non-aqueous solutions, restorers *shall* follow all
55 guidelines set by the AHJ.

Liquid application procedures include, but are not limited to:

- wetted media (e.g., cleaning cloth, sponge, brush);
- sprayer (e.g., pump, pressure, foaming, trigger);
- low-pressure flushing;
- immersion (e.g., washing machines, sinks, ultrasonics)*;
- pressure washing; or
- vapor and steam cleaning.

*Restorers *should* evaluate the porosity and composition of materials to determine those that can be cleaned by immersion methods and those that cannot. These materials are referred to, respectively, as Porous Type 1 and Porous Type 2, in the current edition of the *ANSI/IICRC S540 Standard for Trauma and Crime Scene Cleanup*.

8.4.3 The Application of Sanitizers, Disinfectants, and Antimicrobials

When using sanitizers, disinfectants, and antimicrobials, restorers *shall* follow the manufacturer's labeled directions. The restorer *should* physically remove UFM from contents surfaces prior to applying sanitizers, disinfectants, and antimicrobials. The use of sanitizers, disinfectants, and antimicrobials *should* not be a substitute for cleaning.

8.4.4 Abrasive Removal Processes

Some contents surfaces can accept gentle abrasive removal processes. These processes often combine mechanical action with a substance. The abrasive can be either the substance used or the application media. Both the substance and the media can vary in aggressiveness.

Examples of substances and media include, but are not limited to:

- abrasive substances may include one or more of the following:
 - liquid and powdered cleansers;
 - metal polishes; or
 - rubbing compounds.
- abrasive media may include one or more of the following:
 - finest steel wool (0000);
 - sandpaper; or
 - abrasive pad.

Restorers handling contents containing blood, bodily fluids, and Other Potentially Infections Materials (OPIM) *should* have the appropriate training, certifications and experience. Restorers *shall* follow all applicable regulations set by the AHJ. Refer to current edition of ANSI/IICRC S540 Standard for Trauma and Crime Scene Clean-up for more information.

8.5 Recategorization of Contents

Contents that were originally considered restorable may be recategorized as preservable or non-restorable based on an unsuccessful attempt to restore the item to its pre-loss condition.

8.5.1 Non-restorable Contents

Non-restorable contents *should* be documented before disposal and *should* not be disposed of without the written consent of the client and when applicable, the appropriate Materially Interested Parties (MIPs).

8.5.2 Preserved and Conserved Contents

Prior to returning contents that have been preserved or conserved, but not completely restored, it is recommended that restorers advise the client of the condition of the item.

8.6 Post Restoration Evaluation

The primary method to evaluate the effectiveness of source removal *should* be visual inspection. A secondary method can include wiping the surface with a dry absorbent media (e.g., folded paper or terry towel, white cosmetic sponge, cellular rubber sponge) then visually inspecting for any residue transfer. In addition to a visual inspection, contents *should* be evaluated for the presence of loss-related malodors.

When surfaces and materials do not meet internal clearance criteria, it is recommended that the item be further evaluated to determine next steps, which can include, but are not limited to the following:

- additional cleaning;
- odor management (Refer to *Section 8: Deodorization*); or
- re-categorization (e.g., preservable, non-restorable).

8.7 Third-Party Sampling/Laboratory Analysis and Other Third Parties

When verification is requested regarding the presence or absence of UFM related to a specific event(s), MIPs may consider using the services of a qualified third-party to perform sampling to be independently interpreted by a qualified and accredited laboratory.

9 Odor Control

9.1 Introduction

The principal objectives in addressing damage following a loss event are to restore appearance, utility, and value to contents. Though not specifically addressed by those terms, the odor of contents following a loss is of great consequence to the property owner and occupants. Some loss related odors, such as those from a fire or smoke event, are malodorous and can compromise indoor environmental conditions.

Restorers *should* utilize odor control processes and procedures based on the type and level of Unwanted Foreign Matter (UFM) impact. Faint odors resulting from UFM impact may be removed by a single process or procedure. More intense odors, particularly those which have penetrated porous and semi-porous materials may require multiple processes and procedures. Restorers *should* communicate with clients that some loss-related odors can take time to remove, particularly absorbed odors from fires that are driven by pressure and heat.

Detectable odors from various perils are often indicators that loss-related residues (i.e., UFM) are present. Restorers *should* address client concerns regarding loss-related odors regardless of whether visible UFM is present. The detection of odors is subjective and can vary from person to person based on sensitivity, age, genetics, gender, psychological, and physical conditions.

As with source removal procedures, restorers *should* qualify anticipated results with clients and Materially Interested Parties (MIPs) before attempting odor restoration (i.e., removal). Restorers *should* evaluate certain items, such as bedding and pillows, for the efficacy, practicality, and cost effectiveness of any attempted restoration.

9.2 Odor Control Processes and Procedures

Odor control is a combination of processes, procedures, equipment, and products designed to reduce or eliminate loss-related odors. Restorers *should* determine which remedial procedure(s) to employ based on their training, experience, and in some instances, on-site products or process trials.

The following are examples of odor control processes that can apply to contents:

- source removal;
- direct contact aqueous odor counteractants (mixed with aqueous detergents, steam or sprayed on);
- liquid oxidation:
 - hydrogen peroxide;
 - sodium hypochlorite (chlorine bleach); and
 - chlorine dioxide.
- gaseous oxidation:
 - ozone;
 - hydroxyls; and
 - chlorine dioxide.
- absorbent, adsorbent, vapor release media;
- off gassing procedures (e.g., desorption, heat); and
- disinfectants, antimicrobials, sanitizers.

When practical and permissible, restorers can leave contents in place while deodorizing structural components (e.g., walls, ceilings, floors, fixtures) to provide the added benefit that the process being used on the structure can also treat the contents. Malodorous contents that have been removed from the loss site (e.g., packed out) *should* be taken to a facility that has the ability to use deodorizing processes. It is recommended that restorers have a dedicated area to perform odor control treatments.

1 Loss related and other secondary damage may result in conditions impacting contents that cannot be
2 remedied, by cleaning alone. If the decision is made to attempt further repair (e.g., refinishing,
3 reupholstering), an odor control process may still be required.

4 5 **9.2.1 Source (Physical) Removal**

6
7 Restorers *should* utilize source removal of UFM as a primary step in odor control. While the presence of
8 visible UFM is an indicator of the potential presence of loss related odors, the absence of visible evidence
9 does not imply the contents item is not emitting loss related odors. Source removal is a combination of dry
10 mechanical procedures and liquid (wet) procedures. Refer to *Section 8: Contents Cleaning and Restoration*
11 for more information.

12 13 **9.2.2 Liquid Odor Counteractants as an Additive to Detergents and Degreasers**

14
15 Restorers *should* utilize liquid odor counteractants when performing liquid (wet) removal procedures on
16 contents. Odor counteractants may reduce or eliminate odor on target surfaces and materials. Other than
17 the physical removal of UFM, dry mechanical removal processes alone may not be effective in addressing
18 odors on porous and semi-porous materials.

19
20 Restorers *should* know that detergents and degreasers that are effective in source removal can be
21 augmented to provide effective odor removal on many odorous surfaces and materials by adding the odor
22 counteractant to the cleaning solution. Restorers *should* follow the chemical manufacturer's
23 recommendations on dilution ratios, compatibility, and application rates.

24
25 Restorers *should* choose the appropriate method of application-based on the nature of the surface material
26 and the porosity of materials and surfaces impacted by UFM.

27 28 **9.2.3 Odor Removal by Oxidation**

29
30 Oxidation is an odor control method proven effective on certain types of losses. For example, contents from
31 fires with natural fuels (e.g., wood, paper) may respond well, whereas contents from fires that consume
32 other fuels (e.g., synthetic, protein) may be less effective. Non-gaseous oxidizers used in restoration are
33 either a dry powder or liquid form and are designed to be mixed with water, or produce an oxidizing gas
34 generated by a device.

35
36 Non-gaseous oxidizers include, but are not limited to:

- 37 ▪ hydrogen peroxide;
- 38 ▪ sodium hypochlorite (i.e., chlorine bleach);
- 39 ▪ chlorine dioxide; and
- 40 ▪ hypochlorous acid.

41
42
43 Gaseous oxidation generation includes:

- 44 ▪ chlorine dioxide added to water, an activator and a reactor;
- 45 ▪ ozone*;
- 46 ▪ hydroperoxide;
- 47 ▪ hydroxyls*; and
- 48 ▪ a combination of any of the above.

49
50
51 *Special considerations when using these procedures require occupants, pets, and sometimes plants to
52 vacate the areas being treated until such time that it is deemed safe to re-enter. Restorers *shall* post 'Do
53 Not Enter' warning signs (including "safe re-occupancy" time) at all points of ingress and egress during any
54 on-site odor control process that emits liquids, gases, or vapors into the air.

Use of reactive oxidizing chemistry *shall* be done with caution. Oxidizers can react with materials and substances present in the environment including but not limited to:

- background chemicals present prior to the loss;
- loss related byproducts; and
- cleaning and remediation products.

9.2.3.1 Gaseous Oxidation Use

Restorers *shall* comply with Authorities Having Jurisdiction (AHJ) when using ozone generating devices or any machine that may produce reactive chemicals. For example, in the United States, OSHA has set exposure limits when producing ozone. Many restoration firms designate environmentally sealed spaces or rooms within their contents processing facility where ozone can be more safely utilized.

9.2.4 Odor Control Media (Adsorbent, Absorbent, Vapor Release)

Qualified restorers *should* know that certain heavily impacted porous and semi-porous contents can continue to emit loss-related odors after the initial application of odor control processes and procedures described in this section. For example, contents with restricted access to airflow (e.g., contents that are packed out in boxes or similar containers, furniture cabinets or drawers) may require prolonged treatment with vapor phase media. In these situations, it is recommended that restorers utilize treated media that release odor counteractants over an extended period of time.

Restorers *should* use caution when using dry vapor phase odor treatments to avoid direct contact with contents. It is recommended that the media is introduced to the box of contents using breathable containers (e.g., sachet bags) or surface protection of drawers (e.g., aluminum foil). Restorers *should* remove any media that could spill or otherwise come into physical contact with the contents prior to completion of the project. Protective sachet bags may remain inside boxed contents until returned to the client. However, restorers *should* communicate the presence and the intended purpose for leaving them there.

9.2.5 Desorption

Desorption is the opposite of absorption. When confronted with a deeply absorbed odor on porous and semi-porous materials that do not respond to previously described odor control procedures (e.g., fire related odors driven by heat) restorers may consider using a desorbing procedure on certain contents items (typically items made of wood). Desorption solutions that contain alcohol are flammable. Restorers *shall* adhere to all safety protocols set forth by the AHJ, including proper use of PPE.

Restorers who perform desorption procedures *should* incorporate intensive exhaust ventilation into the process to remove the desorbed odors and substances from the areas where the items are being treated.

Note: Denatured alcohol (also called methylated spirits, in Australia, Canada, Ireland, New Zealand, South Africa, and the United Kingdom; wood spirit; and denatured rectified spirit) is ethanol that has additives to make it poisonous, bad-tasting, foul-smelling, or nauseating to discourage its recreational consumption. It is sometimes dyed so that it can be identified visually.

9.2.5.1 Heat

In addition to liquid desorption procedures restorers may utilize the application of heat as a method of promoting off gassing of absorbed odors. Treated contents *should* emerge free of absorbed odors without compromise to their structural or surface integrity. Heat treatment *shall* occur within an area designed and maintained in compliance with all applicable health and safety regulations established by the AHJ.

9.2.6 Sanitizers, Disinfectants, and Antimicrobials

Products used for disinfection, microbial growth, and sanitization can often contain constituents with deodorizing properties. Restorers *should* read the manufacturer's label to determine whether these products also treat related odors. Restorers *shall* follow all product's label directions for dilution ratios and application methods. Disposal of the product *shall* follow the information provided on the safety data sheet. Restorers *shall* adhere to any laws and regulations set forth by the AHJ regarding their use.

9.3 Quality Control Inspection

Odor conditions *should* be evaluated periodically throughout the restoration process to verify the effectiveness of the Restorative Work Plan (RWP) and to identify any need for corrective action. When loss-related odors are detected, restorers *should* first confirm that all procedures outlined in the RWP have been accurately and thoroughly implemented.

If odors persist, targeted surface or item-specific testing may assist in locating residual odor sources. Refer to *Section 9.4.1 Persistent Odor Investigation and Testing* for additional guidance.

Final odor evaluations *should* occur following source removal and completion of odor control processes. When feasible, more than one individual may participate in odor assessments to ensure objectivity. Client participation in the final odor evaluation is recommended to verify satisfactory results under normal temperature and relative humidity conditions.

9.4 Subjectivity of Odor Detection

The effectiveness of loss-related odor removal is inherently subjective. Opposing views may arise over the presence or absence of loss-related odor; complicated further if the odors are claimed to arise intermittently.

Other issues that may factor into the differences in odor detection include, but are not limited to:

- environmental (e.g., heat, moisture, airflow);
- physiological (e.g., gender, olfactory fatigue, hypersensitivity);
- psychological (e.g., emotional, suggestion); and
- monetary (e.g., parties seeking financial gain or avoidance).

9.4.1 Persistent Odor Investigation and Testing

If loss-related odors are detected after source removal and odor control procedures, the restorer *should* test odor emissions from surfaces and materials by sense of smell. Examples of odor identification include, but are not limited to:

- isolation (containment):
 - surface isolation; and
 - specimen isolation.
- odor transfer (patch test).

Refer to the current edition of the *ANSI/IICRC S700 Standard for Professional Fire and Smoke Damage Restoration*, for more information on specific persistent odor investigation and testing methods.

9.4.2 Odor Testing Evaluation and Dispute Resolution

The evaluation of odor detection testing *should* include the client or the complainant who originally perceived the odor, and the restorer. When there are disputes, it may be necessary to include others (e.g., MIPs, impartial unbiased third parties) as part of an investigative odor panel to further investigate the detection of odors. Odor test evaluations *should* be performed in a manner so as not to influence the decisions of others on the panel. Individual test results of each panelist *should* be documented.

1 Some loss-related odors may not respond to any odor control procedure and continue to emit odors. In this
2 situation, the item *should* be deemed non-restorable.
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10 Limitations, Complexities, Complications, and Conflicts (LCCCs)

10.1 Introduction

Restorers can be faced with project conditions that present challenges. These challenges can produce limitations, complexities, complications, and conflicts. Restorers *should* have an understanding of these issues and communicate them to the appropriate parties (e.g., clients, Materially Interested Parties (MIPs)). The following is a definition of each of these challenges that restorers may encounter on a contents project.

Limitations and complexities are often known or anticipated prior to the start of the project. Restorers *should* discuss these challenges and the potential consequences of both actions and inactions with the client and MIPs. Restorers *should* document these challenges and get approval(s) when not directly addressed in the contract. To the extent possible, approval(s) *should* be obtained prior to the commencement of work.

10.2 Limitations

Restrictions placed upon the project, that limit the execution of the assessment, scope, Restoration Work Plan (RWP), or their anticipated performance outcomes. Limitations that prevent or alter services to be rendered in compliance with this Standard *should* be documented. Limitations placed on any project that are inconsistent with this Standard can result in a conflict. Examples of limitations can include, but are not limited to:

- available funds;
- access;
- causation has not been resolved; and
- project site not released by the Authorities Having Jurisdiction (AHJ).

10.3 Complexities

Conditions are likely to cause a project to become more difficult or complex and do not prevent the execution of the assessment, scope, RWP, or anticipated performance outcomes. Complexities are generally apparent or predictable prior to the commencement of the restoration project and *should* be addressed in the scope and included in the RWP. Examples of complexities can include, but are not limited to:

- client absent;
- client unable to be involved in decisions (e.g., illness, age, emotional state);
- items of high value; and
- extent of damage (e.g., severity).

10.4 Complications

Conditions that are not apparent or predictable and arise after the start of work. Complications *should* result in an amendment to the assessment, which may necessitate an alteration to the scope, RWP, and may generate a change order. The client and MIPs *should* be notified in writing, as soon as practical, of any complication that develops. Examples of complications can include, but are not limited to:

- unexpected damage, not related to the primary loss, discovered on a project (e.g., mold, material deterioration or other condition issues);
- unrealistic expectations by client or other MIPs;
- hazardous materials discovered; and
- secondary or incidental damage.

10.5 Conflicts

1 Limitations, complexities, and complications that result in a disagreement between the parties involved in
2 the assessment, scope, RWP, or their anticipated performance outcomes, are called conflicts. When
3 limitations, complexities, or complications develop or are placed on the project by the client, which prevent
4 compliance with this Standard, restorers can choose to negotiate an acceptable agreement, decline the
5 project, stop work, or accept the project with appropriate releases and disclaimers. Conflict resolution
6 *should* be documented and retained, including but not limited to:

- 7
- 8 ▪ unreasonably limited access (e.g., limitation);
- 9 ▪ restorer unwilling to accept responsibility for high value items (e.g., complexity); and
- 10 ▪ addressing unrelated damage (e.g., complication).

References

Portions of the following documents are referenced herein and thereby constitute provisions of this Standard. At the time of publication, the references cited were current. All cited references are subject to revision, and those using this Standard *should* reference the most recent editions.

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- 1 Zlotnik, C. *Just Contents, All Kinds of Contents Damage and Solutions*. ASCR Summit and Exhibition,
- 2 September 2004.
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