IICRC S220
Standard for Professional Inspection of Hard Surface Floor Coverings

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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 inspection methods and procedures from the less critical, by characterizing the former as the "standard of care." The IICRC S220 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 inspection project.

A Scope, Purpose, and Application

A.1 Scope

This Standard describes the non-destructive procedures, methods, and systems for professional inspectors to follow when inspecting light commercial and residential hard surface floor coverings; including stone, laminate, wood, ceramic, and resilient.

This Standard does not specifically address the protocols and procedures for installing hard surface floor coverings. Users of this Standard *should* refer to the *References* Section for additional information.

A.2 Purpose

The purpose of this Standard is to define basic, non-destructive procedures and techniques for evaluating hard surface types, characteristics, and conditions in order to determine appropriate procedures for inspecting hard surface floor coverings. It was not written to teach inspection procedures. Numerous manuals, videotapes, workshops, and seminars are available to teach comprehensive hard surface floor covering inspection procedures.

Every floor installation has unique characteristics that *should* be evaluated to determine which inspection procedures are applicable. Since every claim that initiates the need for inspection services is unique, in certain circumstances, common sense, experience, and professional judgment may justify a deviation from this Standard.

A.3 Application

This standard was created for use by professional inspectors, flooring manufacturers, product suppliers, building contractors, architects, specifiers, designers, distributors, flooring retailers, claimants, facility managers, institutions, and others involved in the hard surface floor covering industry.

B Definitions

Adhered: secured and supported by adhesion of a bonding material to a surface.

Ambient lighting: light that is already present in an area before any additional/supplemental lighting is added. It usually refers to natural light, either outdoors or coming through windows.

Bevel: a shaped edge on individual flooring pieces.

Board: a piece of wood or other hard material used for floors.

Bond: the adherence of one material to another.

Commissioning party: the entity that contracts for the services of the flooring inspector. There are many types of commissioners who may need the services of a professional inspector.

Contaminant: any unwanted substance, particle, or material that makes something impure, dirty, or less effective. A substance that can prevent a proper bond between materials.

Curling: a condition in resilient flooring where the edges of the material are concave and raised higher than the center.

Cushioned vinyl: any vinyl sheet floor covering incorporating a foam layer as part of its construction.

Decorative layer: the layer of laminate or resilient flooring providing visual aesthetic properties. This can be achieved either through the use of print film or direct digital printing.

Deflection: the vertical movement of floor joists, subfloor, or entire floor structure, when subjected to the effects of loads or volume change.

Delamination: the loss of bond and separation between layers within the flooring structure.

Doming: a condition in resilient flooring where the edges of the material are convex, and the center is raised higher than the edges.

Embossed: a decoration or raised pattern or texture on the surface of the flooring material.

Engineered wood flooring: wood flooring board made of multiple layers, with a top veneer of desired hardwood.

Laminate flooring core: the dense inner layer of laminate flooring, usually made from high-density fiberboard (HDF) or medium density fiberboard (MDF).

Plank: wood flooring three inches or wider in face width.

Shear: external stresses exceeding the strength of the wood fibers within an individual plank of engineered flooring, resulting in the wood fibers being torn apart.

Strip: wood flooring less than three inches in face width.

Subfloor: the structural layer intended to provide support for design loadings which may receive floor coverings directly if the surface is appropriate or directly via an underlayment if its surface is not suitable.

Substrate: the underlying support surface upon which the flooring is installed.

Underlayment: a layer of material that gets placed over the subfloor/substrate prior to the installation of the finished flooring in order to accomplish a specified purpose.

Wide plank: wood flooring wider than 5 inches in face width.

Working time: the amount of time, per the manufacturer, that an adhesive can be exposed and still remain effective.

1 Professional Hard Surface Floor Covering Inspector

The hard surface floor covering category includes a wide range of materials that vary by manufacturing techniques, composition, construction, installation, and maintenance requirements.

It is inevitable that concerns from Materially Interested Parties (MIPs) (e.g., retailers, flooring installers, claimants) will arise, which creates the need for specially trained inspectors who have knowledge of all areas of the hard surface floor covering industry. Inspectors *should* employ practical field testing and scientific methodologies in investigating, documenting, and arriving at accurate and unbiased conclusions of concerns. The inspection is complete when the report has been released. Only when specifically asked by the commissioning party can an inspector consult regarding potential remediation of the concern(s).

1.1 Independent Inspections vs. Evaluations

There are a variety of floor covering professionals who evaluate claims. They typically fall into one of three primary groups:

1.1.1 Initial Evaluation

Commissioners and claimants have historically relied on the expertise of long-term and experienced specifiers, retailers, and installers to view obvious defects and claims. Their primary objective is to find a resolution or document the concern and initiate a formal claim.

1.1.2 Manufacturer Evaluation

Manufacturer evaluations can be performed by an employee or a manufacturer's representative. Their primary objective is to document the concern, determine the cause, and when possible, find a resolution to the concern. When there is no agreement on a resolution, an independent inspector may be commissioned.

1.1.3 Certified Independent Inspectors

Certified independent inspectors *should* be independent, and their inspections *should* be free from influence that might be perceived by claimants to be biased toward a manufacturer, retailer, or installer.

A certified inspector *should* complete recognized industry training, have passed written exams, and have met specific criteria set by an industry-recognized hard surface floor covering inspection certification body.

1.2 Inspector Responsibilities

Professional hard surface floor covering inspectors *should* serve as the eyes and ears of the commissioning party in the field and *should* be able to communicate their findings in writing. They *should* approach each claim objectively in order to arrive at unbiased conclusions. Their inspection process *should* include, but not be limited to:

- observation;
- collection of facts and samples;
- photo documentation;
- research; and
- testing.

Inspectors *should* observe standards of professional decorum, dress, and grooming to maintain their credibility, and that of the commissioning party. Communications with claimants *should* be confined to fact-gathering without covering extraneous information, drawing speculative or premature conclusions, or making warranty interpretations. Inspectors *should* understand that even innocent comments with claimants

can be misunderstood or misconstrued and cause problems at a later time for a commissioning party. Inspectors *should* spend sufficient time inspecting the flooring, performing field tests with appropriate tools, and questioning MIPs, in order for all parties to be satisfied that the problem has been thoroughly and accurately documented. In their observations and deliberations, inspectors *should* avoid influence by MIPs and base their conclusions on the facts gathered in the inspection process alone.

Inspection reports are the exclusive property of the commissioning party. Inspectors *should* be able to respond to questions regarding their report and explain and support their documentation and conclusions if questioned by the commissioning party or other MIPs. For example, if the commissioning party is the manufacturer and the claim report is conveyed by the commissioner to other MIPs, and the report is questioned, with the commissioner's written permission, the inspector may answer questions.

Inspectors *should* be realistic regarding their capabilities and limitations. They *should* seek assistance from industry specialists when claim issues exceed their core competencies.

2 Commissioning Parties

2.1 Definition of Commissioning Party

A commissioning party is the entity that contracts for the services of the flooring inspector. There are many types of commissioners who may need the services of a professional inspector. The commissioning party may have various reasons for commissioning an inspection with the primary reason being the resolution of a concern.

2.2 Qualifying Inspectors

Commissioning parties *should* take reasonable steps to determine whether an inspector's qualifications are appropriate for a particular concern. Commissioning parties may ask the inspector for evidence of current certification, relevant experience regarding the concern requiring inspection, references, and proof of general liability insurance.

2.3 General Guidelines

General guidelines set forth in this Standard *should* be used in tandem with guidelines provided by the party commissioning the inspection.

2.3.1 Understanding the Commission

An inspector's primary objective is to collect information and answer a commissioning party's questions. It is not the inspector's responsibility to resolve the claim. Only when specifically asked by the commissioning party can an inspector provide consultation regarding potential remediation of the concern(s).

Commissioning parties *should* be specific about what areas or concerns are to be inspected. The inspector *should* address concerns related to the scope specified on the request; however, if other concerns on the same material are brought to the attention of the inspector, the inspector *should* consult with the commissioning party as to how to address the additional concerns.

The inspector *should* understand the scope of the inspection and if necessary, clarify it with the commissioning parties. The inspector *should* discuss fees for inspection services with the commissioning parties. If services beyond a basic inspection are to be provided (e.g., testing, correcting, instructing, or travel) then the additional fees for such extra services *should* be agreed upon prior to the extra service being performed.

2.3.2 Conducting the Inspection

Inspectors *should* understand expectations set by the commissioning parties regarding promptness in contacting the claimant(s) and in preparing inspection reports. Inspectors *should* communicate expectations to the commissioning party related to the submittal of inspection reports. Inspectors *should* conduct themselves as professionals, and all actions *should* be performed in an ethical manner and without conflict of interest. If a known conflict of interest arises or is anticipated, the inspector *should* disclose that conflict to the commissioning party or decline the inspection.

2.3.3 The Report

Inspection reports *should* be computer-generated and not handwritten. Proper grammar and sentence structure *should* be used to enhance the professionalism and readability of reports. Some commissioning parties require that reports be completed online using proprietary software. Inspectors *should* not draw conclusions, make statements, or state opinions that are not supported by the evidence presented within their reports.

The inspection report belongs to the commissioning party. The commissioning party *should* decide to whom the report is to be distributed.

2.3.4 Inspection Broker Services

When an inspection broker's services are engaged, they *should* follow this Standard.

3 Writing Inspection Reports

Inspection reports *should* be concise, factual, accurate, unbiased, and grammatically correct to enable commissioners to envision what the inspector sees in the field. A well-written inspection report *should* walk the commissioning party through the inspection process, providing a clear understanding of the concerns observed during the inspection process. Reports *should* be prepared in a manner that would withstand potential litigation.

Carefully written and proof-read inspection reports are an essential component of the inspection process. Inspectors *should* exercise care and attention to detail when compiling reports for the commissioning party with the understanding that the report may be made available to Materially Interested Parties (MIPs).

3.1 Inspection Report Requirements

All inspection reports *should* be computer generated, not handwritten. All reports *should* be subjected to spelling and grammar checks.

Artificial Intelligence (AI) programs *should* be used with caution. Information generated by AI is not always accurate as it is not familiar with the intricacies of the floorcovering industry.

The inspection report *should* provide a format to document all appropriate information relating to the inspection, as well as a general outline for a report narrative. The inspector can produce and submit a proprietary report. In some cases, a standardized report form may be provided by the commissioning party.

3.2 Documentation

3.2.1 Notes

It is recommended that inspectors document information (e.g., notes) as soon as the claimant begins discussing events leading up to the request for inspection, answering questions, and providing a chronological history of the claim. It is recommended that documentation continue with recording data from field tests. Inspectors *should* be aware that field notes are subject to discovery in litigation.

3.2.2 Diagrams

Diagrams may be included to document the location of areas of concern as relates to entries, windows, light sources, proximity to furnishings, fixtures, or traffic areas. Diagrams *should* be included when requested by the commissioning party.

3.2.3 Photography

Refer to *Section 5: Photography* for more information.

3.3 Report Writing Sequence

A report *should* be divided into two general sections. The first section *should* include, but not be limited to the following, if applicable:

- claim numbers;
- date of commission requests and date of inspection;
- commissioning party information;
- claimant information;
- retailer information;
- inspector administrative information:

    - usage (i.e., residential or light commercial).
- product information (i.e., construction, color, type, underlayment);
- amount of product purchased, installed, and inspected;
- subfloor/substrate, underlayment, and moisture barrier/retarder;
- age of building;
- date, areas, and type of installation;
- reason for the inspection;
- maintenance and cleaning details; and
- heating and cooling methods:
    - confirm humidifier/dehumidifier and HVAC year-round settings. operation and setting.

The second section of the form *should* be a report narrative in which details of the inspection are described. The claim narrative *should* follow a sequential format or progression of the onsite inspection process, followed by a conclusion.

The inspector *should* obtain temperature/humidity data logs (e.g., HVAC app, in situ probe), if they are available. These *should* not be used in place of the inspector's measurements.

3.3.1 Claim History

Claim history documentation *should* include the sequence of events leading up to the claim from applicable MIPs (e.g., retailer, installer, claimant).

Claim history documentation *should* include, but not be limited to the following, if applicable:

- approximate date of installation;
- date concern(s) observed;
- when the concern was reported, and to whom;
- change of condition (progressing or improved);
- repair attempts and procedures; and
- maintenance procedures.

3.3.2 Site Description

Inspectors *should* describe the physical site to provide perspective for the commissioning party regarding site-specific conditions that could impact the claim being evaluated.

3.3.3 Inspector Observations

The inspector's observations *should* identify the concerns and describe them using industry-accepted terminology. Inspectors *should*:

- evaluate and document the concern, installation methods, and materials;
- to the best of their ability, confirm the product being inspected is the same as the product in the commissioning party's request (e.g., invoice, bill of sale, warranty information, attic stock);
- document observations with photographs to support findings;
- include a designation of specific rooms or areas in which the concern is located; and
- list physical conditions (e.g., lighting, furnishings, fixtures) that enhance or diminish the appearance of the concern.

3.3.4 Reporting Field or Laboratory Test Results

When field testing is performed by the inspector, it is recommended that the inspector include:

- the number of tests;

- the location of test;
- the test apparatus used;
- the test results;
- the test protocol to which the test was performed to; and
- photo documentation of field test.

Laboratory test results released to the inspector may be included in the inspection report.

Any test documentation *should* be kept, regardless of the results.

3.3.5 Conclusions and Documentation

An inspector's conclusions *should* state the determination of cause of the concern and be supported by one or more of the following:

- data collection;
- field and/or laboratory testing;
- photographic documentation;
- manufacturer recommendations/instructions; and
- industry standards.

Sometimes a conclusion cannot be determined from the data collected. In this case, the inspector may recommend what further steps can be taken (e.g., laboratory or destructive testing).

Inspectors *should* not discuss details with anyone other than the commissioning party until the final report is completed and submitted. Reports are the property of the commissioning party. If the report or the inspector's findings are requested from anyone other than the commissioning party, those inquiries *should* be referred to the commissioning party.

4 Inspection Tools and Equipment

This document is not designed to be a training manual. Inspectors *should* have the appropriate tools and equipment and be trained in their use to perform inspections.

4.1 Inspecting Hardwood Flooring

It is recommended that the wood flooring inspector have the following tools and equipment, including but not limited to:

- moisture meters:
  - invasive moisture meters, insulated pin or hammer probes; and
  - non-invasive meters for wood and concrete.
- thermo-hygrometer;
- digital camera;
- marking devices to point out affected locations in photographs;
- rare earth magnets;
- common flashlight, a higher-powered inspection light, ultra-violet light;
- magnification device;
- tape measure with inches and millimeters;
- machinist ruler;
- calipers, digital;
- 6' and/or 10' straight edge, dry line (string), laser level;
- pH test strips, distilled water, clean, white towel;
- hardwood floor approved tape;
- surface temperature reader;
- feeler gauge;
- taper gauge;
- thin pry bar/molding lifter;
- expansion detection tools (e.g., paperclip, dental pick);
- knife (utility), pliers, awl;
- knee pads; and
- batteries.

Inspectors *should* follow manufacturer's instructions and label directions for the safe use of tools.

4.2 Inspecting Laminate Flooring

It is recommended that the laminate flooring inspector have the following tools and equipment, including but not limited to:

- moisture meters, non-invasive meters for wood and concrete;
- thermo-hygrometer;
- digital camera;
- marking devices to point out affected locations in photographs;
- rare earth magnets;
- common flashlight, a higher-powered inspection light, ultra-violet light;
- magnification device;
- tape measure with inches and millimeters;
- machinist ruler;
- calipers, digital;
- 6' and/or 10' straight edge, dry line (string), laser level;
- pH test strips, urine test strips, distilled water, clean, white towel;
- blue painters' tape;
- surface temperature reader/infrared thermometer;

- feeler gauge;
- taper gauge;
- suction cup;
- thin pry bar/molding lifter;
- expansion detection tools (e.g., paperclip, dental pick);
- knife (utility), pliers;
- knee pads; and
- batteries.

Inspectors *should* follow the manufacturer's instructions and label directions for the safe use of tools.

4.3 Inspecting Resilient Flooring

It is recommended that the resilient flooring inspector have the following tools and equipment, including but not limited to:

- moisture meters, non-invasive meters for wood and concrete;
- thermo-hygrometer;
- digital camera;
- marking devices to point out affected locations in photographs;
- rare earth magnets;
- common flashlight, a higher-powered inspection light, ultra-violet light;
- magnification device;
- tape measure with inches and millimeters;
- calipers, digital;
- 6' and/or 10' straight edge, dry line (string), laser level;
- pH test strips, distilled water, clean, white towel;
- blue painters' tape;
- surface temperature reader/infrared thermometer ;
- feeler gauge;
- taper gauge;
- suction cup;
- thin pry bar/molding lifter;
- expansion detection tools (e.g., paperclip, dental pick);
- knife (utility);
- knee pads; and
- batteries.

Inspectors *should* follow the manufacturer's instructions and label directions for the safe use of tools.

4.4 Inspecting Ceramic and Stone Floor Covering

It is recommended that the ceramic and stone flooring inspector have the following tools and equipment including but not limited to:

- moisture meters, non-invasive meters for wood and concrete;
- thermo-hygrometer;
- digital camera;
- marking devices to point out affected locations in photographs;
- common flashlight, a higher-powered inspection light, ultra-violet light;
- magnification device;
- depth gauge;
- tape measure with inches and millimeters;
- calipers, digital;
- 2', 4', and/or 10' straight edge, dry line (string), laser level;

- pH test strips, distilled water, clean, white towel;
- blue painters' tape;
- surface temperature reader/infrared thermometer;
- feeler gauge;
- speed square;
- taper gauge;
- sounding tool;
- level tool with bubble;
- thin pry bar/molding lifter;
- expansion detection tools (e.g., paperclip, dental pick);
- knife (utility), pliers, awl;
- knee pads; and
- batteries.

Inspectors *should* follow manufacturer's instructions and label directions for the safe use of tools.

4.5 Photographic Equipment and Accessories

Inspectors *should* have photographic equipment and accessories needed to adequately document a concern. This could include video recording in certain instances.

Refer to *Section 5: Photography* for further details and specific information on proper usage.

5 Photography

5.1 Photography of Inspections

The hard surface floor covering inspector *should* include photos of observations related to the written report. The use of photographs *should* also serve as confirmation of what the inspector has observed during the inspection process. Inspectors *should* provide written captions to explain what each photograph illustrates.

5.2 Types of Cameras and Other Equipment

5.2.1 Digital Cameras

Cameras are available in a variety of sizes with a range of different features. The inspector *should* determine which camera best suits the needs of the work. The inspector *should* be able to review a photograph in real-time and immediately view the image to determine if it depicts the desired information.

5.2.2 Video Cameras

In situations where still photography cannot clearly document the claimants' concerns, other mediums, such as video, *should* be used. Video can accurately document movement, range of motion, and sounds related to the consumer's concern. If the use of video or audio equipment is not viable or permitted on an inspection site, this *should* be documented in writing as a limitation. Refer to *Section 11: Limitations, Complexities, Complications, and Conflicts (LCCC)* for additional information.

5.2.3 Specialty Cameras

5.2.3.1 Photographic Magnification

Photographic magnification *should* be used for documentation of details that cannot be captured with the use of standard photography (e.g., broken finish, presence of micro-scratches, microchips, seam weld, crazing, cracking). Magnification can be performed with the use of handheld loupes, camera lenses, and cameras designed specifically for that purpose. Minute details can also be documented using portable electronic microscopes that connect to an external source capable of recording and storing data.

5.2.3.2 Infrared Cameras

Specialty infrared cameras can show information beyond the ability of the human eye. These cameras can help identify areas of variances in temperatures.

5.2.3.3 Additional Equipment

When a photograph is taken of a large area, small marking devices (e.g., pointers, pens, releasable colored tape, numbered cards) can be used to help identify the location(s) of the concern. The inspector *should* consider whether the glossy or matte finish of their marking device can enhance or diminish light reflection in the photograph. Different colored arrows or numbered cards can help differentiate between multiple locations.

Another common piece of supplemental equipment is a tripod to steady the camera.

The inspector *should* ensure the images are taken under adequate lighting conditions. If lighting is inadequate, additional lighting equipment may be used to ensure proper documentation. The additional equipment used can include, but is not limited to, a common flashlight, a higher-powered inspection light, and an ultra-violet light.

5.2.3.4 Computer Programs

The original photograph *should* not be altered. Photo software can be used to identify problem areas (e.g., change the dimensions of the photo, or to insert indicators like lines, arrows, or circles into the photo). Software enhancements *should* only be performed on copies.

5.3 Individual Claim Needs

5.3.1 Room Scenes

Overview photos *should* be taken of each area where the flooring material is installed. Photographs of individual rooms can provide information about a concern including maintenance, general appearance, use, and condition of the site. This would depend on the needs or requirements of the commissioning party. Refer to Section 11 on: *Limitations, Complexities, Complications, and Conflicts (LCCC)* for more information.

5.3.2 Perspective

The inspector *should* avoid photographing building occupants. This also includes situations unbecoming to the consumer and unrelated to the claim.

5.3.3 Ambient and Supplementary Lighting

5.3.3.1 Ambient lighting

The inspection *should* be performed initially from a standing position and under normal lighting conditions.

5.3.3.2 Supplementary lighting

Supplementary lighting *should* be used when normal lighting conditions are inadequate to view the concern. Supplemental lighting, if used, *should* be documented.

5.4 Photo documentation

All information pertinent to the inspection *should* be photo documented, including but not limited to the following, if applicable and available:

- exterior of building (e.g., downspouts grade, landscaping, irrigation, parking lot/sealers);
- overview of room the flooring is installed in; location of direct sunlight (windows/sliders);
- condition of substrate in adjacent rooms (e.g., substrate contaminants, adhesive residues, standing water), if accessible;
- furniture (e.g., castors, supporting legs, chair glides/felt pads);
- view of concern from a standing position;
- closeup of concern;
- concern under magnification;
- meter readings (e.g., moisture meters, pH, gloss, thermal hygrometers, infrared thermometers);
- test results/locations (e.g., expansion gap, fastener schedule, moisture, bond, ambient temperature, slab temperature);
- measurements (e.g., thickness, width, length, gap size);
- packaging of materials;
- batch codes or box end stamps;
- pictures of sundry materials (e.g., adhesives, patches, levelers, grouts, setting materials);
- photo of run number or stamp on the back of the flooring product;
- tools and equipment (e.g., trowel(s), sponges, nailers, underlayment);

- climate controls (e.g., thermostat, humidifier/dehumidifier, Heat Recovery Ventilation (HRV) Energy Recovery Ventilation (ERV));
- cleaning solutions (e.g., cleaners, labels, directions);
- cleaning equipment (e.g., mops, steam cleaner, machines, machine attachments [brushes, pads]);
- soiling at entryways; and
- walkout mats.

6 Chain of Custody, Storage, and Handling

Chain of custody protocols *should* be followed. Proper handling and storage of flooring and installation products *should* comply with manufacturer's guidelines and industry standards.

6.1 Chain of Custody Form

A chain of custody form is a written record that *should* comprise of the receipt or release of any sample(s), a detailed description of the submitted sample(s), including but not limited to dimensions, material, and color.

The original chain of custody form *should* be maintained by the inspector who generated it during their handling of the sample(s). Any release of the material *should* have a copy attached that describes when that sample(s) is released to any materially interested party (MIP) or testing facility.

6.2 Sample Shipping

The sample *should* be shipped via a service that utilizes a reliable package tracking system (e.g., U.S. Postal Service by Registered Mail, FedEx, UPS). Samples *should* be packaged to ensure the integrity of the shipment.

7 Wood Flooring Inspection

For a wood flooring inspection, the inspector *should* observe, collect, and document the following:

- if the wood floor is engineered, solid, or assembled solid;
- species of wood;
- width of the board;
- affected area of concern;
- approximate amount of installation affected (localized or widespread);
- if the condition is increasing in frequency or severity;
- substrate/subfloor underlayment type;
- grade level of substrate/subfloor;
- moisture testing of material and substrate/subfloor, if possible;
- relative humidity and temperature:
  - of installed space; and
  - of crawl space/basement.
- crawl space:
  - conditioned, ventilated, open;
  - type of conditioning system (e.g., HVAC, dehumidification, passive);
  - insulation;
  - moisture barrier;
  - distance from bottom of joists to ground;
  - evidence of water or moisture;
  - sump pump; and
  - is there ground cover:
    - coverage complete; and
    - properly seamed.
  - ventilation:
    - operational;
    - blocked;
    - open; and
    - closed.
  - if open, type of ground:
- try to ascertain acclimation of product(s);
- installation method; and
- describe maintenance procedures and products used.

It is recommended that the wood flooring inspector use the measurement units consistent with the manufacturer's installation guidelines and specifications (e, g., imperial, metric).

The following concerns are detailed for prefinished wood floors. For site finished floors, refer to National Wood Flooring Association (NWFA) or other applicable standards.

7.1 Buckling

Buckling refers to when the wood flooring has separated or lifted from the subfloor.

During a wood flooring inspection, the inspector *should* observe, collect, and document the following**:**

- expansion space at vertical obstructions, including at transitions and hardware;
- fastener schedule;
- underlayment;
- subfloor/substrate:
  - deflection.

- measurement of the peak and valley of the floor from the desired plane (undulation);
- moisture readings;
- acclimation of material, subfloor, and environment;
- confirm humidifier/dehumidifier operation and setting; and
- confirm humidifier/dehumidifier and HVAC year-round settings.

If glued, confirmation of adhesive, transfer, and trowel size can only be verified by destructive testing.

If the floor is buckled, the wood flooring inspector *should* not provide subfloor flatness measurements, as they may not be accurate.

7.2 Checking

Wood checking is a lengthwise separation of the wood cells that normally extend across the rings of annual growth (parallel to, or along the wood rays), as the result of stresses from the drying process.

During a wood flooring inspection, the inspector *should* observe, collect, and document the following**:**

- product construction and description;
- flatness of material (i.e., cupping or crowning);
- finish and stain characteristics over/around/in check;
- visible change in stain;
- finish separation;
- presence and appearance of filler;
- grading allowances;
- confirm humidifier/dehumidifier operation and setting; and
- Confirm humidifier/dehumidifier and HVAC year-round settings.

7.3 Color Change

Color change is an undesired color variation from specified color.

During a wood flooring inspection, the inspector *should* observe, collect, and document the following**:**

- species of wood;
- grading of wood;
- any repairs performed;
- type of color change;
- how many boards are affected (is there a pattern to the occurrences);
- where color change is located:
  - in the field or along the edges of boards – missing stain;
  - throughout/widespread – moisture issue, natural coloration/mineral streak; and
  - individual boards affected or crosses over adjacent boards.
- compare color of flooring to attic stock and/or store sample, if available;
- location of potted plants, windows (that have exposure to direct sunlight), or other moisture-prone areas; and
- presence of area rugs.

7.4 Crowning

Crowning is a “convex” or “crowned” condition or appearance where the center of individual boards become higher than the edges. This can also be a type of warp.

During a wood flooring inspection, the inspector *should* observe, collect, and document the following**:**

- when the condition was first observed;
- if there is a pattern to the condition, if so description;
- topical water contact;
- if there is a crawl space/basement, describe condition (i.e., ground cover, joist to soil measurement, insulation, type of subfloor/substrate, visible moisture/puddles);
- expansion space at vertical obstructions;
- measure the depth of convex deviation;
- appearance of uninstalled boards;
- gapping visible between boards;
- measure multiple board spans (depending on board width) moisture content of flooring in relation to subfloor;
- check for delamination in engineered products;
- if repair or remodel took place, attempt to determine the age of subfloor;
- maintenance methods, products, and frequency used;
- examine area for impermeable products in area of concern (i.e., rubber mat);
- attempt to ascertain acclimation of product; and
- confirm humidifier/dehumidifier and HVAC year-round settings.

7.5 Cupping

Cupping is a concave or dished appearance of individual boards, with the edges of the board raised higher than the center.

During a wood flooring inspection, the inspector *should* observe, collect, and document the following:

- when the condition was first observed;
- if there is a pattern to the condition, if so description;
- if there is a crawl space/basement, describe condition (i.e., ground cover, joist to soil measurement, insulation, type of subfloor, visible moisture/puddles);
- measure the depth of concave deviation;
- appearance of uninstalled boards;
- gapping visible between boards;
- measure multiple board spans (depending on board width);
- measure width of board;
- moisture content of flooring in relation to subfloor (take and record readings at multiple depths to prove the progression of the moisture gain or loss);
- check for separating layers in engineered products;
- maintenance methods, products, and frequency uses;
- examine impermeable products in are of concern (i.e., rubber mats); and
- attempt to ascertain acclimation of product.

7.6 Separation of Layers

7.6.1 Delamination

Delamination is the separation of two layers/plies within a piece of engineered flooring due to the lack of an adhesive bond that is typically identified as a clean separation at the glue-line.

During a wood flooring inspection, the inspector *should* observe, collect, and document the following**:**

- confirm engineered flooring;
- when the condition was first observed;
- any evidence of water damage (i.e., water intrusion, plumbing leaks);
- if separation is visible;
- that the separation is along a bond line which can be further evidenced by:

    - lack (or minimal amount) of wood tissue transfer between plies; and
    - examination under UV light.
- measurement of the separation within a plank (i.e., length and depth);
- positioning of the delamination within the plank (veneer and core or within the core layers);
- confirm humidifier/dehumidifier operation and setting; and
- confirm humidifier/dehumidifier and HVAC year-round settings.

7.6.2 Shear

Shear is caused by external stress exceeding the strength of the wood fibers within an individual plank of engineered flooring, resulting in the wood fibers being torn apart. When examining this type of failure in an engineered wood flooring plank, wood fibers will be visible at the point of separation, remaining bonded to the adhesive layer.

During a wood flooring inspection, the inspector *should* observe, collect, and document the following**:**

- confirm engineered flooring;
- when the condition was first observed;
- any evidence of water damage (e.g., water intrusion, plumbing leaks);
- if separation is visible;
- wood fibers being torn apart;
- torn wood fibers bonded to the adjacent layer;
- measurement of the separation within a plank (i.e., length and depth); and
- confirm humidifier/dehumidifier and HVAC year-round settings.

7.7 Gaps

Gaps between abutting wood floorboards in the installed floor may be normal or abnormal.

During a wood flooring inspection, the inspector *should* observe, collect, and document the following:

- determine product construction (e.g., engineered, hybrid, solid);
- when the condition was first observed;
- age of floor;
- shape of gaps;
- time of year gaps are visible;
- location of gaps (i.e., ends or sides);
- location of gaps within installation;
- gap dimensions;
- if there is a pattern to the condition (e.g., around exterior doors, sliding glass doors, windows, floor registers, at appliances, every 4’);
- measure multiple board spans (depending on board width) measure the individual boards within the span (consistent sets);
- moisture content of boards;
- if glue-down installation, verify bond;
- if nailed down installation check fastener schedule;
- confirm humidifier/dehumidifier and HVAC year-round settings;
- presence of filler; and
- examine edge bevel.

7.8 Gloss Variation

During a wood flooring inspection, the inspector *should* observe, collect, and document the following**:**

- appearance compared to adjacent or unaffected areas;

- lighting conditions – eliminate shadows and glare, (i.e., shadowbox, inspection light):
  - walk around the planks of concern – viewing angle can change appearance.
- look for texture variations;
- amount of affected boards;
- pattern or recurrence of concern;
- maintenance products;
- maintenance procedures;
- compare flooring to attic stock and/or store sample; and
- check for buckling, cupping, or crowning.

Manufacturer's tolerances *should* be taken into account for gloss variation.

7.9 Inconsistent Bevel

This condition is exhibited as variation in the size/degree of edge beveling in a single board and/or adjacent planks as compared to other boards in the installation.

During a wood flooring inspection, the inspector *should* observe, collect, and document the following**:**

- grading and characteristic;
- the amount of bevel;
- if bevel is missing on one or more edges;
- if bevel matches the rest of the installation or store sample;
- number of affected boards;
- if cut ends are a factor; and
- rough cut on bevel.

Hand scraped or distressed products do not have an industry standard for bevel. The inconsistent application of edge finish (i.e., stain or paint) can give the appearance of an inconsistent bevel.

7.10 Racking

Racking is a condition where the distribution of board lengths avoids discernible patterns (i.e., stair step, H-joints, or short stagger).

During a wood flooring inspection, the inspector *should* observe, collect, and document the following**:**

- determine the number of locations with end joint stagger, stair step, and H-joints, in relation to manufacturer and industry requirements; and
- determine average length of the boards in relation to the entire square footage (i.e., shorts).

7.11 Noise

Noise is an audible sound in an installed wood floor or within the floor system. An occasional noise within any properly installed wood floor system is not abnormal.

During a wood flooring inspection, the inspector *should* observe, collect, and document the following**:**

- type of underlayment (e.g., asphalt-saturated kraft paper, #15 or #30 felt paper, rosin paper);
- subfloor/substrate issues:
  - deflection;
  - flatness of subfloor; and
  - subfloor noise(s).
- expansion space at vertical obstructions;
- direction of flooring to joists (perpendicular or parallel);

- type of installation (e.g., fastener, floating, glue-down, glue assist);
- fastener spacing, if applicable;
- joint movement between boards (if uninstalled tongue and groove material is available, measure size variation between tongue and groove);
- end joint stagger between planks; and
- confirm humidifier/dehumidifier and HVAC year-round settings.

Confirmation of subfloor/substrate condition can only be verified by destructive testing (i.e. water damage, confirmation of subfloor type). If glued, confirmation of adhesive, transfer, and trowel size can only be verified by destructive testing.

7.12 Shake

Shake is a separation of the wood's fibers along the grain (parallel to the growth rings), that usually occurs between the rings of annual growth.

During a wood flooring inspection, the inspector *should* observe, collect, and document the separation and movement of wood fibers.

7.13 Splinters

Slivers and/or splinters protrude from the surface of the floor, especially at the edges of the boards.

During a wood flooring inspection, the inspector *should* observe, collect, and document the following:

- finish and stain characteristics over/around/in splinter;
- visible change in stain;
- finish separation;
- presence and appearance of filler;
- released or still attached;
- maintenance products;
- maintenance procedures;
- presence of splinters on uninstalled board; and
- location of fasteners, if applicable.

Splinters from textured, distressed, hand scraped, wire-brushed, rough-sawn, reclaimed, or otherwise purposefully manufactured or site-altered flooring can occur.

7.14 Splits/Cracks

A tearing apart or rupturing of the wood that may run at various angles to the growth rings.

During a wood flooring inspection, the inspector *should* observe, collect, and document the following**:**

- flatness of material (i.e., cupping or crowning);
- measure depth, length, and width of the splits/cracks;
- finish and stain characteristics over/around/in split;
- visible change in stain;
- finish separation;
- presence of filler; and
- grading allowances.

7.15 Wood Destroying Insects

An invasion of live wood-destroying insects, which may include powder post beetles or termites.

During a wood flooring inspection, the inspector *should* observe, collect, and document the following**:**

- species of wood;
- presence of frass (fine powdered substance);
- presence of insects;
- number of affected boards;
- location of affected boards;
- size of exit holes/tunnel; and
- pattern or channels.

Wormholes in the face of wood products that were present at installation can also be from worms, or other wood boring insects that were in the living tree. These wormholes are acceptable within many flooring grades.

8 Laminate Flooring Inspection

For a laminate flooring inspection, the inspector *should* observe, collect, and document the following:

- affected area of concern;
- approximate amount of installation affected (i.e., localized or widespread);
- measurement of the widest and longest continuous span without a break/transition;
- number of doorways/cased openings, and sizes if applicable;
- substrate/subfloor type;
- type of underlayment;
- presence of moisture barrier/retarder and type;
- grade level of substrate/subfloor;
- if the condition is increasing in frequency or severity;
- moisture testing of material and substrate;
- relative humidity and temperature:
  - of installed space; and
  - of crawl space/basement.
- if crawl space is present:
  - conditioned, ventilated, open;
  - type of conditioning system (e.g., HVAC, dehumidification, passive);
  - insulation;
  - moisture barrier;
  - distance from bottom of joists to ground;
  - evidence of water or moisture;
  - sump pump; and
  - is there ground cover:
    - coverage complete; and
    - properly seamed.
  - ventilation:
    - operational;
    - blocked;
    - open; and
    - closed.
  - if open, type of ground.
- describe maintenance procedures and products used.

The inspector *should* use the appropriate measurement standards consistently (e.g., imperial, metric).

It is recommended that the inspector use the measurement units consistent with the manufacturer's installation guidelines and specifications (e.g., imperial, metric).

8.1 Buckling/Tenting

Buckling or tenting is a condition where the laminate flooring has separated or lifted from the subfloor.

During a laminate flooring inspection, the inspector *should* observe, collect, and document the following**:**

- expansion space at vertical obstructions;
- deflection;
- area of concern (i.e., localized or widespread);
- damage to locking system;
- transitions; and
- measurement of longest continuous run along length and width of planks without a transition.

Swollen edges are not considered buckling or tenting.

If the flooring is buckling/tenting, the inspector *should* not provide subfloor flatness measurements, as they may not be accurate.

8.2 Cap Sheet Concerns

Laminate cap sheet concerns can include, but are not limited to, cloudy or hazy appearance, embossing concerns and off-register, missing cap sheet, sheen variation and porosity/pinholes.

During a laminate flooring inspection, the inspector *should* observe, collect, and document the following:

- where is it located (i.e., edges or center of a plank);
- variations of color, sheen, or gloss as compared to unaffected areas; and
- pattern or recurrence of concern.

8.2.1 Cloudy or Hazy Appearance

During a laminate flooring inspection, the inspector *should* observe, collect, and document the following:

- appearance (i.e., texture, cracks, clarity, streaks);
- appearance under magnification (check for porosity);
- anything used in the area which could cause appearance variation (i.e., toys, castor chairs);
- floor protectors:
  - type;
  - size; and
  - physical condition.
- appearance as compared to adjacent or unaffected areas;
- appearance as compared to uninstalled planks, if available;
- maintenance products used;
- maintenance methods used;
- identify cleaning frequency;
- appearance of spots and stains; and
- ability to clean floor (e.g., spots, stains, surface contaminants):
  - test clean an area of concern and compare results to uninstalled material if available; and
  - products and procedures used in testing (e.g., pH test results, urine test strip results).

8.2.2 Embossing Concerns/Off-Register

During a laminate flooring inspection, the inspector *should* observe, collect, and document the following:

- measure and record visual appearance:
  - length;
  - width;
  - variation in surface texture;
  - shape;
  - size;
  - repetition/repeat pattern; and
  - specific pieces or widespread:
- appearance as compared to adjacent or unaffected areas;
- visual variations in the depth or pattern of embossing;
- sheen variation compared to unaffected areas and uninstalled planks, if available;
- proper alignment of embossing to flooring pattern; and
- appearance as compared to store sample, if available.

8.2.3 Missing Cap Sheet

During a laminate flooring inspection, the inspector *should* observe, collect, and document the following:

- variations of color, sheen, or gloss;
- variation in texture;
- appearance under magnification;
- appearance as compared to adjacent or unaffected areas; and
- appearance as compared to uninstalled planks, if available.

8.2.4 Sheen Variation

During a laminate flooring inspection, the inspector *should* observe, collect, and document the following:

- appearance compared to adjacent or unaffected areas;
- appearance compared to uninstalled planks, if available;
- maintenance products and procedures (i.e., soiling, polishes, cleaning agent residues);
- floor flatness;
- buckling or tenting;
- lighting conditions - eliminate shadows and glare (i.e., shadowbox, inspection light): and
  - walk around the planks of concern - viewing angle can change appearance.
- look for texture variations.

Manufacturing related sheen variation is usually on random planks throughout the installation. Locally caused sheen variation can affect multiple adjoining planks and may be splotchy or streaky. Test cleaning with acetone, ammonia, or 90% isopropyl alcohol and a white cloth can indicate if residue is left on the planks.

8.2.5 Porosity/Pin Holes

Pinholes in the wear layer/cap sheet that hold contaminants, such as soiling.

During a laminate flooring inspection, the inspector *should* observe, collect, and document the following:

- check for soiling that is difficult to remove, and
- examine the cap sheet under magnification:
  - check for soiling in areas of porosity (pinholes).

8.3 Core Board Concerns

Core board concerns include but are not limited to dips, voids, bumps, or lumps as seen on the face of the laminate plank.

During a laminate flooring inspection, the inspector *should* observe, collect, and document the following:

- when was the condition first noticed;
- condition (i.e. stable or progressing);
- location (i.e., edges or center of planks);
- description of concern (i.e. dips, voids, bumps, or lumps);
- fracturing of the cap sheet/décor layer; and
- foreign matter under the cap sheet:
  - insects;
  - pieces of torn décor layer; and
  - other debris/trash, dirt, ink marks.

These observations are to determine manufacturing-related core board concerns only. Concerns such as swollen joints or damage to the core board during installation are not manufacturing-related and will manifest differently.

8.4 Delamination

Delamination is a separation between the layers that comprise a laminate plank. This can be between the cap sheet and decor layer or the decor layer and core board.

During a laminate flooring inspection, the inspector *should* observe, collect, and document the following:

- where is it located (i.e., edges or center of planks); and
- apply pressure to affected area to check for movement to identify delamination conditions as opposed to swollen edges and core board concerns.

8.5 Gapping

Gaps in laminate floors can occur at the ends or sides of planks.

The inspector *should* investigate the type of locking system used by the manufacturer of the floor of concern.

During a laminate flooring inspection, the inspector *should* observe, collect, and document the following:

- progression of concern;
- where gaps are located;
- size of gaps;
- appearance of gaps (i.e., uniform or wedge-shaped);
- examination of edge bevel;
- installation tools used;
- subfloor/substrate issues:
  - deflection; and
  - flatness of subfloor.
- expansion space at vertical obstructions;
- longest runs along width and length of planks without a transition;
- end joint stagger;
- if gaps can be closed/opened;
- location of HVAC ducts and registers if in area of concern;
- integrity of locking mechanism;
- damage to locking mechanism;
- confirm if irregular-shaped swollen edges are present; and
- confirm humidifier/dehumidifier and HVAC year-round settings.

Gapping can be manufacturing-related due to milling of the locking mechanism. If available, examination of uninstalled planks *should* be done to confirm if the concern is manufacturing related.

8.6 Noise

Noise is an audible sound in an installed laminate floor or within the floor system.

During a laminate flooring inspection, the inspector *should* observe, collect, and document the following**:**

- location(s) of condition;
- when sound was first noticed;
- type of underlayment:
  - attached;

    - sheet; and
    - roll.
- end joint stagger between planks;
- wax/sealant/dressing application of uninstalled plank;
- subfloor/substrate issues:
    - deflection;
    - flatness of subfloor; and
    - subfloor noise(s).
- expansion space at vertical obstructions;
- repeatability/frequency of occurrence;
- assembling uninstalled material if available to replicate noise; and
- confirm humidifier/dehumidifier and HVAC year-round settings.

Noise may be manufacturing-related due to milling of the locking mechanism. If available, examination of uninstalled planks *should* be done to confirm the concern is manufacturing related.

If the flooring is locked-in and buckling, the inspector *should* not provide flatness measurements, as they may not be accurate.

8.7 Photo/Decor Layer Concern

8.7.1 Fading

Fading is a concern where there is a loss of color within the décor layer, this *should* not be confused with a cloudy finish in the cap sheet. This is usually seen around areas with direct sunlight.

During a laminate flooring inspection, the inspector *should* observe, collect, and document the following:

- location (i.e., by doors, windows, or away from direct sunlight);
- examine shape and color variation (i.e., rug or furniture repositioning);
- appearance compared to adjacent or unaffected areas;
- appearance compared to uninstalled planks, if available; and
- appearance under magnification.

8.7.2 Pattern Alignment/Off-Register

Pattern alignment/off-register concerns can be contained to one plank or various planks throughout the installation.

During a laminate flooring inspection, the inspector *should* observe, collect, and document the following:

- appearance compared to adjacent or unaffected areas;
- appearance compared to uninstalled planks, if available;
- appearance compared to store sample, if available;
- if pattern is misaligned, measure variation;
- check for repeating patterns and their presence in the installed field;
- ascertain if the concern is unique or if it is found in other planks of similar pattern, and
- check for the presence of a damaged decor layer.

8.8 Proud/Raised Edge(s)

Proud/raised edge(s) is a condition where one edge of a plank/tile is higher than an adjacent plank/tile when assembled.

During a laminate flooring inspection, the inspector *should* observe, collect, and document the following:

- progression of condition;
- installation tools used;
- location on planks:
  - long side;
  - short side; and
  - corners.
- measurement of variation, may be measured with feeler, depth, or taper gauge;
- press down on suspect areas to ascertain whether or not the joint moves;
- confirm if irregular-shaped swollen edges are present;
- deflection;
- expansion space at vertical obstructions;
- subfloor/substrate flatness; and
- examine uninstalled planks.

If the flooring is locked-in and buckling, the inspector *should* not provide flatness measurements as they may not be accurate.

When manufacturing-related, the concern usually runs the entire edge of the plank. If the concern is suspected to be manufacturing-related, manufacturer's tolerances should be taken into account.

When installation-related, the inspector *should* check for tapping block damage and damage to the core. Lack of expansion space can cause damage to the core, which can show as raised edges.

Swollen edges can present on only one side of the plank. The inspector *should* look for an irregular or rounded shape to the area of concern.

8.9 Surface Concerns

Surface concerns in a laminate flooring can include scratches, chips, and dents.

During a laminate flooring inspection, the inspector *should* observe, collect, and document the following:

- where located (i.e., edges or center of planks);
- type of concern;
- layers of construction affected (e.g., does it penetrate the decorative layer or core?);
- cross adjoining planks;
- isolated or throughout;
- found in uninstalled material;
- appearance of concern:
  - fractured;
  - texture;
  - size of concern; and
  - evidence of impact damage.
- appearance under magnification;
- stable or progressing;
- furniture relevant to the concern (e.g., wheel/caster type); and
- floor protectors:
  - type;
  - size; and
  - physical condition.
- number and type of pets;
- toys, shoes, or equipment used inside the home;

- exterior contaminant transfer, and placement and condition of walk-off mat(s);
- pattern, direction, and frequency of concern; and
- maintenance products used.

8.9.1 Micro-chipping

Micro-chipping is small continuous chips on the edge of a plank that usually appear white in color.

During a laminate flooring inspection, the inspector *should* observe, collect, and document the following:

- examination of edges under magnification;
- consistency of side affected;
- contiguous, crescent-shaped appearance;
- installation tools used; and
- examine uninstalled planks.

8.10 Swollen Joints

Swollen joints in laminate flooring can manifest on both sides or can be contained to one side of a plank at a joint.

During a laminate flooring inspection, the inspector *should* observe, collect, and document the following:

- area of concern near water source (i.e., refrigerator with water line, dishwasher, sink, water bowls);
- moisture reading over area of concern and in an unaffected area;
- appearance of joint under magnification;
- examine exterior of structure for possible cause of concern;
- maintenance procedures and tools;
- test areas with urine test strips; and
- if the swelling meets on both sides of the joint.

The inspector *should* not interpret manufacturer water warranties.

8.11 Warped Planks

Warped laminate plank concerns include crook (banana boards), concave bowing, and convex bowing.

In order to confirm the warp in the planks, the inspector *should* attempt to assemble uninstalled (e.g., attic stock) planks.

8.11.1 Crook (Banana Boards)

The distortion in laminate flooring that occurs within a plank that has a deviation in a direction perpendicular to the edge, from a straight line from end to end of the piece. Crooks can be caused by improper storage of material.

The inspector *should* confirm the measurement of the space left between the edge of the plank and the edge of the straight edge using a taper gauge or feeler gauge.

8.11.2 Concave Bowing

The condition in laminate flooring where the edges of the material are raised higher than the center (similar to cupping). The inspector *should* confirm the measurement of the space between the top of the plank and the bottom of the straight edge with a taper or feeler gauge in width or length.

8.11.3 Convex Bowing

The condition in laminate flooring where the edges of the material are lower than the center (similar to crowning).

The inspector *should* confirm the measurement of the space left between the plank and the bottom of the straight edge with a taper or feeler gauge in width and length.

9 Stone, Ceramic Flooring Inspection

For a stone or ceramic tile inspection, the inspector *should* observe, collect, and document the following:

- affected area of concern;
- type of material, (e.g., porcelain, ceramic, stone);
- nominal format of the tile (to include size and edge configuration) and the pattern of the installation;
- finish of the surface (e.g., glazed, polished, honed, flamed);
- type of grout and general width of the joint;
- substrate/subfloor type;
- grade level of substrate/subfloor;
- type of underlayment;
- type of overall construction and support system (e.g., pier and beam, joists, crawl space, slab);
- try to ascertain acclimation of the product;
- if the condition is increasing in frequency or severity; and
- maintenance procedures and products.

Based on visual inspection, destructive testing may be needed.

9.1 Tile Concerns

9.1.1 Warpage

A concave or convex curvature of a tile that causes the surface to not be perfectly flat. This concern is specific to ceramic or porcelain tiles.

During a ceramic or porcelain tile inspection, the inspector *should* observe, collect, and document the following:

- examine uninstalled material;
- check the measurement of the face of the tile in both lengthwise and diagonal dimensions; and
- check for any lippage concerns.

Note: The industry tolerance for this condition is found in *ANSI A137.1 American National Standards Specifications for Ceramic Tile*.

9.1.2 Out of Square (Wedging)

Out of Square (wedging) concerns is when the tile is not square in appearance or measurement.

During a stone or ceramic tile inspection, the inspector *should* observe, collect, and document the following:

- confirm 90-degree corners of an uninstalled tile;
- measure the variation in the grout joint width;
- measure the variation of the tile offset;
- verify possible shift in tile placement; and
- accurate measurements of each side and both diagonal dimensions.

Note: The industry tolerance for this condition is found in *ANSI A137.1 American National Standards Specifications for Ceramic Tile*. Specialty tiles (e.g., rustic, natural, handmade) are not held to the same tolerances.

9.1.3 Chipping

During a stone or ceramic tile inspection, the inspector *should* observe, collect, and document the following**:**

- examine the areas of concern to identify specific issues;
- identify the number of occurrences;
- identify edge type of tile, cushion edge, or rectified;
- describe in detail the differences in appearance between the occurrences;
- examine affected areas under magnification;
- examine the presence of grout in the chipped areas;
- identify any service work done, including any repairs to the floor; and
- document lippage conditions in the area of concern.

Hairline fractures surrounding the chipped area may indicate topical impact. Another possible cause may be an issue in the surface of the tile whereby the pattern or glaze layer(s) are not properly bonded to the tile body. Inspectors *should* reach out to the tile manufacturer in regard to edge type.

9.1.4 Tile Cracking

During a stone or ceramic tile inspection, the inspector *should* observe, collect, and document the following**:**

- confirm perimeter expansion joints and field soft joints;
- check if cracking crosses several tiles and continues through adjoining grout joints;
- check to see if there is a repeat pattern to the condition;
- examine the floor for the presence of hollow tiles; and
- examine for fine lines which may indicate compression cracking.

Confirmation of subfloor/substrate condition can only be verified by destructive testing. In natural stone tiles, what may be perceived as a crack may actually be a naturally occurring inclusion or vein in the product.

For more information, refer to the latest edition of *ANSI A108.02-4.6 Standard for Installation of Ceramic Tile,* General Requirements: Materials, Environmental, and Workmanship, and local standards and guidelines.

9.1.5 Facial Anomalies

Facial anomalies can include many different visual inconsistencies within one or more tiles.

During a stone or ceramic tile inspection, the inspector *should* observe, collect, and document the following**:**

- describe anomaly and conditions that impact visibility;
- distance and angle from occurrence viewed:
  - lighting conditions; and
  - soil conditions;
- number of occurrences;
- number of tiles affected; and
- repeat or visible pattern.

Refer to ANSI A108.01-5.0 Standard for Installation of Ceramic Tile: American National Standards Specifications General Requirements: Structures, Substrates, and Preparation for Tile, Visual Inspection of Tile Work, and *ANSI A137.1 American National Standards Specifications for Ceramic Tile* for specific guidelines when examining ceramic tile for these conditions.

In the case of natural stone, pits, voids, and fissures may be present and are considered to be inherent to the product. The inspector *should* note the dimensions of such characteristics and refer to the latest edition of the *National Stone Institute, Dimension Stone Design Manual; Chapter 22-1, Tolerances in the Dimension Stone Industry.*

9.1.6 Crazing

The cracking that occurs in fired glazes or other ceramic coatings due to critical tensile stresses. This concern is specific to glazed ceramic or porcelain tiles.

Crazing is considered to be a manufacturing-related condition unless it is incorporated into the style or design of the tile. The glaze on the tile surface exhibits spider cracking and often is only seen at close range. Visibility *should* be considered when inspecting this condition. The inspector *should* check for grout in the occurrences under magnification.

9.1.7 Bubbles

Bubbles are specific to ceramic or porcelain tiles. Bubbles on the surface of the tile may indicate a lack of bond between the surface glazing and the tile body.

During a ceramic or porcelain tile inspection, the inspector *should* observe, collect, and document the following:

- tapping the bubble which will emit a hollow sound, if there is separation from the tile body;
- any chipping in the area of concern; and
- the size of the anomaly and frequency of occurrence.

9.1.8 Bumps

Bumps are specific to ceramic or porcelain tiles. Bumps differ from bubbles in that they are solid and well-bonded to the tile body. They often indicate debris or foreign substances under the glazing.

During a stone or ceramic tile inspection, the inspector *should* observe, collect, and document the following:

- tapping the bump, which will not emit a hollow sound, and
- the size of the anomaly; and
- frequency of occurrence.

9.1.9 Color, Texture, and Gloss Variations

The manufacturer's product literature lists a V-rating, which indicates the inherent texture and color variations to be expected in the styling of the tile. When examining an installation for this concern, the inspector *should* refer to the explanation of this rating in the latest edition of the *ANSI A137.1 American National Standards Specifications for Ceramic Tile* and in the *TCNA Handbook for Ceramic, Glass, and Stone Tile Installation.*

It is recommended that the inspector attempt to research the invoice/shipping documents and box labels to determine if all material was from the same production lot.

9.1.10 Lippage

Lippage is a condition where one edge of a tile is higher than an adjacent tile, giving the finished surface an uneven appearance. Lippage conditions may be found to be within industry tolerance, but are deemed unsatisfactory to the claimant.

During the inspection, the inspector *should* observe, collect, and document the following:

- determine the average grout joint width:
  - determine the depth of the grout joints.
- measure the approximate average warpage;

- identify locations of uneven tile surfaces; and
- measure the occurrences (using a feeler gauge, depth gauge, or similar instruments).

Several factors *should* be considered when evaluating this condition. Each installation is unique as the tolerance is based on specific installation information (i.e., tile layout and patterns, average grout joint width, warpage observed to be within *ANSI A137.1 American National Standards Specifications for Ceramic Tile* specifications, thickness variations, lighting, and applicable manufacturer recommendations).

With the increased use of large format tiles with rectified edges and narrow grout joints, the perception of lippage is often an unexpected issue with some end users. Running bond installations also present an increased chance of the inspector being called in to examine an installation where the claimant has expressed this complaint.

For more information, refer to the latest edition of *ANSI A108.02 Standard for Installation of Ceramic Tile,* General Requirements: Materials, Environmental, and Workmanship.

9.1.11 Hollow Sounding Tile

During a stone or ceramic tile inspection, the inspector *should* observe, collect, and document the following:

- sound the floor and determine:
  - count or percentage of hollow tile; and
  - describe reverberation.
- approximate percentage of hollow sound per individual tile;
- check for perimeter expansion space accommodation;
- check for the presence of field soft joints;
- measure the continuous span of the tile in relation to soft joint placement;
- attempt to ascertain the type of subfloor/substrate; and
- check structure for evidence of subsequent movement.

When membranes and crack isolation products are used, there may be a difference in the sound noted than when the tile is directly bonded to the substrate; however, the sound is expected to be consistent. Variations in sound may be noticed with sounding equipment. The sound of hollow tiles alone does not always constitute failure.

For more information, refer to the latest edition of the *Tile Council of North America (TCNA) Handbook for Ceramic, Glass, and Stone Tile Installation, Method EJ171 Movement Joint Guidelines for Ceramic, Glass, and Stone.*

9.2 Grout Concerns

During a stone or ceramic tile inspection, the inspector *should* observe, collect, and document the following:

- grout material used:
  - batch numbers on bag(s) used (check attic stock if available); and
  - expiration date(s), if applicable.
- date the grout was placed in reference to tile installation;
- average grout joint width;
- type of tile;
- any repairs performed;
- if and when topically applied sealer was used;
- if and when topically applied colorant was used;
- if and when topically applied grout hardener was used; and
- cleaning and maintenance products (check pH of products used), procedures, and history.

9.2.1 Pinholes in the Grout

Small holes in the grout seen in one or several places throughout the installation.

During a stone or ceramic tile inspection, the inspector *should* observe, collect, and document the following:

- amount of water added to the grout mixture;
- speed of the mixing tool used;
- if excessive water was used in clean up (look for rake marks across the joints and washed out pigment);
- check for low and inconsistently finished grout joints;
- check for soft grout; and
- check for powdery grout.

Note: This condition is not usually found in pre-mixed grouts if the installer followed product directions. However, the same conditions may be experienced with 100% solid epoxy and furan grout products, which can result from high-speed mixing, entrapping air under the grout, and air pockets under tiles. Excessive water and/or agitation during cleaning can also result in this condition.

9.2.2 Powdery or Soft Grout Joints

Powdery or soft grout joints can be exhibited by low joints as well as gouges and dislodged material.

During a stone or ceramic tile inspection, the inspector *should* observe, collect, and document the following:

- loose or missing grout and grainy material in the joints;
- if the grout used was out of date;
- if grout may have been partially hydrated and remixed;
- possible exposure to temperature extremes;
- installation clean-up methods;
- amount of water added to the grout mixture;
- if excessive water was used in clean up (look for rake marks across the joints and washed out pigment);
- if the grout is moisture sensitive;
- if contaminated grout ingredients were used;
- number of bags used and how they were mixed; and
- maintenance products and procedures.

Note: If the tile is highly absorbent, this may have prevented the grout material from being properly hydrated. A premature application of a petroleum-based sealer may have also resulted in this condition. Pre-mixed and epoxy grout may also be subject to soft conditions.

9.2.3 Grout Voids

Partial or complete missing grout in the installation.

During a stone or ceramic tile inspection, the inspector *should* observe, collect, and document the following:

- examine for dislodged sections of material;
- check for bubble(s) created by air or water in the grout mixture; and
- examine areas of void under magnification.

9.2.4 Variations in Grout Color

During a stone or ceramic tile inspection, the inspector *should* observe, collect, and document the following:

- information about the placement of the grout, including but not limited to:
  - how the grout was mixed;
  - how much water was used in the mix;
  - how many bags were used;
  - how many bags were mixed together; and
  - expiration date or product batch code.
- varying grout colors can indicate a repair was performed;
- the removal of pigment during grout clean up;
- weather conditions at time of installation; and
- maintenance product and procedures.

The inspector may determine the presence of a remaining spacer by a color variation in the grout joints. The inspector *should* determine if there is an overglazing on the edge of the installed tile.

9.2.5 Grout Joint Widths

During a stone or ceramic inspection, the inspector *should* observe, collect, and document the following:

- the range of the grout joint width;
- the average width of the grout joint;
- if grout joint spacers were used;
- the range of the facial dimension;
- mosaic tile mounting standards;
- check that smaller tiles are centered with larger tiles; and
- ascertain if the tile installation is plumb or square.

When tiles are tilted during installation, the grout joint width can be altered. A similar effect can be seen if the grout material extends onto the face of the tile. All of the above conditions are installation related.

The inspector *should* refer to the latest edition of *ANSI A108.02 Standard of Installation of Ceramic Tile, General Requirements: Materials, Environmental, and Workmanship*, and *ANSI A137.1 American National Standards Specifications for Ceramic Tile specifications, and tile manufacturer's instructions.*

9.2.6 Grout Haze

A cloudy film left on the tile surface after cleaning.

During a stone or ceramic inspection, the inspector *should* observe, collect, and document the following:

- verify type of grout used;
- check under magnification; and
- maintenance products and procedures.

Variations in the reflection of natural light may also be perceived as grout haze. Conditions of this type are inherent to the styling and characteristics of the tile.

9.2.7 Cracking Grout

The inspector *should* inquire as to which grout was selected. Inspectors *should* refer to the grout manufacturer's recommendations, as the improper specification of material and joint width may leave the installation vulnerable to this condition.

During a stone or ceramic inspection, the inspector *should* observe, collect, and document the following:

- inquire as to which grout (manufacturer name and type, i.e., epoxy, cementitious) was used;
- measure range in grout joint widths;
- describe the presence of patterns to the cracking observed;
- check for tile cracking;
- check for the presence of expansion joints (soft joints);
- check for tenting;
- perform sounding tests; and
- check the integrity of the grout material.

10 Resilient Flooring Inspection

For a resilient flooring inspection, the inspector *should* observe, collect, and document the following:

- type of installation (e.g., glue down, floating, loose lay);
- description of concern;
- approximate amount of installation affected (i.e., localized or widespread);
- description of any attempted repairs and methods used in repair;
- substrate/subfloor type;
- type of underlayment;
- presence of moisture barrier/retarder and type;
- grade level of substrate/subfloor;
- floor prep performed;
- if the condition is increasing in frequency or severity;
- relative humidity and temperature of:
  - installed space;
  - substrate; and
  - crawl space/basement.
- If there is a crawl space:
  - conditioned, ventilated, open;
  - type of conditioning system (e.g., HVAC, dehumidification, passive);
  - insulation;
  - moisture barrier;
  - distance from bottom of joists to ground;
  - evidence of water or moisture;
  - sump pump; and
  - is there ground cover:
    - coverage complete; and
    - properly seamed.
  - ventilation:
    - operational;
    - blocked;
    - open; and
    - closed.
- if open, type of ground;
- if it is a floating installation:
  - measurement of the widest and longest continuous span without a break/transition;
  - expansion space at vertical obstructions;
  - pinch points;
  - deflection;
  - presence of additional underlayment; and
  - floor surface flatness field test.
- space between moldings, transitions, jambs, and the surface of the flooring; and
- describe maintenance procedures and products used.

Note: A true subfloor/substrate flatness cannot be quantifiably measured on top of an installed floor.

10.1 Curling

A condition in resilient flooring where the edges of the material are concave and raised higher than the center. Also known as concave bowing.

During a resilient flooring inspection, the inspector *should* observe, collect, and document the following:

- measure the amount of curl;
- attempt to ascertain acclimation of product and subfloor/substrate;
- check expansion space at vertical obstructions;
- check for pinch points;
- take moisture readings (moisture readings are only indicative, not verification of moisture);
- review all previous moisture test results if available;
- presence of moisture barrier/retarder and type;
- check temperature of flooring under direct and non-direct sunlight;
- review maintenance products and methods;
- check for delamination;
- proper application of seam sealer, if applicable;
- adhesive application;
- confirm humidifier/dehumidifier and HVAC year-round settings; and
- examine uninstalled flooring material (e.g., attic stock) if available:
    - note where stored and environmental conditions.

10.2 Delamination

Delamination is a separation between layers of the flooring material which can include the wear layer, topcoat, stabilizer, print film, photo layer, core material, or backing. This is not to be confused with osmotic bubbling or blistering.

During a resilient flooring inspection, the inspector *should* observe, collect, and document the following:

- where it is located (e.g., at joints or seams, in center of plank, tile, or sheet);
- deflection which may make the appearance of delamination;
- subfloor/substrate flatness;
- damage to edges of tiles, planks, or sheets;
- heavy rolling traffic (e.g., castor chairs, heavy equipment, rolling islands); and
- cut areas not seam sealed.

Note: Delamination for the purpose of this document occurs within the product and is not the same as loss of bond between the product and substrate/subfloor.

10.3 Discoloration

Discoloration is a change in the color or hue of the flooring. During the inspection, the inspector *should* observe, collect, and document the following:

- measurement of the concern:
    - length;
    - width;
    - shape; and
    - size.
- variation in color (e.g., yellowing);
- repetition/repeat pattern;
- whether concern is related to seam sealer, grout, or coatings;
- occurs across one tile, plank, sheet, or affects multiple pieces;
- moisture readings (moisture readings are only indicative not verification of moisture);
- if discoloration is uniform and throughout the installation or only in a certain area(s):
    - record specific location(s) such as; under or around appliances, near windows, glass door(s) or entry door(s), heating and cooling vents, radiant heating fixtures;
    - present only in traffic lanes or work areas; and
    - tracking from parking areas or driveways.
- floor mats/entry matting system:

    - type of backing;
    - location of matting;
    - condition of matting; and
    - size of matting.
  - maintenance products:
    - type of cleaning products (e.g., cleaning agent, quaternary disinfectants);
    - floor finish applied; and
    - frequency of use.
  - maintenance procedures;
    - frequency of procedures; and
    - equipment utilized in maintenance program.

Note: Adhesive concerns can only be confirmed through destructive testing.

10.4 Doming

A condition in resilient flooring where the edges of the material are convex, and the center is raised higher than the edges. Also known as pillowing, or convex bowing.

During a resilient flooring inspection, the inspector *should* observe, collect, and document the following:

- measure the amount of doming:
  - vertical movement within the flooring material.
- attempt to ascertain acclimation of product and subfloor/substrate;
- expansion space at vertical obstructions, including pinch points;
- moisture readings (moisture readings are only indicative not verification of moisture);
- temperature of flooring under direct and non-direct sunlight;
- maintenance products and methods;
- examine uninstalled flooring material (e.g., attic stock) if available:
  - note where stored and environmental conditions.
- confirm humidifier/dehumidifier and HVAC year-round settings.

10.5 Gapping

Gapping is the separation between tile and plank joints or seams in sheet flooring. During a resilient flooring inspection, the inspector *should* observe, collect, and document the following:

- area(s) of concern, (e.g., near windows, doors, columns, insets, localized or widespread);
- confirm installation method (e.g., glue down, floating, loose lay);
- where gaps are located (i.e., ends and/or sides);
- size of gaps;
- appearance of gaps (e.g., uniform or wedge-shaped);
- examination of edge bevel;
- installation tools used;
- subfloor/substrate issues;
- deflection;
- flatness of subfloor;
- longest runs along width and length of planks without a transition;
- end joint stagger;
- expansion space at vertical obstructions;
- location of blinds, if applicable;
- temperature of flooring under direct and non-direct sunlight;
- acclimation of flooring material;
- acclimation of subfloor/substrate;
- confirm humidifier/dehumidifier and HVAC year-round settings;

- for sheet goods, determine if seam sealer was applied or seams were heat welded:
  - determine if gapping is consistent or intermittent with seam length.
- measure several installed and uninstalled planks.

10.6 Gouge, Scratch, Tear

Gouge is a deep cut or indentation in the flooring surface with penetration below the wear layer into the printed or backing layer. Scratch is an abrasion in the flooring surface. Tear is a hole or rip in the material.

During a resilient flooring inspection, the inspector *should* observe, collect, and document the following:

- overall appearance of the flooring;
- presence and condition of walk-off mats or matting system;
- location of moveable objects near the area of concern;
- type of traffic in the area of concern;
- type of equipment, furniture, or appliances in the area;
- pattern of concern;
- localized to a specific piece or across multiple pieces;
- severity of gouge, scratch, or tear:
  - depth;
  - width; and
  - length.
- presence of sharp objects, rough surfaces, embedded debris;
- presence of, type and condition of chair glides and casters;
- evidence of smaller scratches or abrasions;
- patterns to the scratches or gouges which can indicate the object that caused the issue;
- layers of the flooring affected;
- location of tear near outside corners, door jambs, appliances, equipment, etc.
- verify type of activity on surface of the flooring; and
- if walkers, wheelchairs, or other assistive devices are used in the area, verify condition of wheels, legs, etc., check tennis balls for debris buildup.

10.7 Indentation

An indentation is a depression in the surface of resilient flooring beyond the inherent texture of the pattern.

During a resilient flooring inspection, the inspector *should* observe, collect, and document the following:

- identify furniture and objects that could cause indentation;
- measure the size, shape, and contact point of the object to the flooring material;
- identify any pattern to indentations;
- identify how often object is moved or relocated;
- identify the type of traffic on the floor (e.g., narrow high heels, heavy rolling loads);
- adhesive displacement: look for ridges around the indentation which would indicate the adhesive was “displaced” or “deformed” out from the applied load; and
- be aware that compressible, acoustical, or soft-core underlayment can compress and prevent the flooring from recovery.

10.8 Ledging

Ledging is a condition where adjacent modules are not uniform in height and do not match from module to module, when assembled.

During a resilient flooring inspection, the inspector *should* observe, collect, and document the following:

- deflection in floor and at each side of the joint(s) of concern;
- flatness of floor;
- debris under area of concern;
- expansion space at vertical obstructions;
- repairs performed;
- examine for broken locking mechanism in floating floors; and
- check attic stock thickness or thickness of installed product if possible.

Note: Manufacturer and industry tolerances for ledging *should* be taken into account.

10.9 Off-Register Embossing and Pattern

During a resilient flooring inspection, the inspector *should* observe, collect, and document the following:

- measure and record visual appearance:
  - length;
  - width;
  - variation in surface texture;
  - shape;
  - size;
  - repetition/repeat pattern; and
  - specific pieces or widespread.
- appearance as compared to adjacent or unaffected areas;
- visual variations in the depth or pattern of the embossing;
- sheen variation compared to unaffected areas or uninstalled material, if available;
- proper alignment of embossing to flooring pattern;
- verify run or lot, if available; and
- appearance as compared to store sample, if available.

Note: Manufacturer and industry tolerances for embossing and pattern *should* be taken into account.

10.10 Out of Square

Out of square is a condition in resilient flooring seen as wedge-shaped gaps. During a resilient flooring inspection, the inspector *should* observe, collect, and document the following:

- measure the planks or tiles for out of square;
- measure flatness of substrate/subfloor;
- verify flooring material and modules are aligned straight;
- localized or widespread;
- verify manufactured or cut or trimmed edges;
- identify design of installation (e.g., herringbone, pattern); and
- rack several planks or tiles together to determine if installed out of square.

Manufacturer and industry tolerances for out of square *should* be taken into account.

10.11 Peaking

Peaking is a condition in resilient flooring where areas of the flooring at adjoining tiles or planks end joints have risen above the intended horizontal plane of the flooring surface.

During a resilient flooring inspection, the inspector *should* observe, collect, and document the following:

- area(s) of concern, (e.g., near windows, doors);

- localized or widespread;
- confirm installation method (e.g., glue down, floating, loose lay);
- confirm installation tools;
- appearance of concern;
- location of window coverings, if applicable;
- temperature of flooring under direct sunlight and non-direct sunlight;
- acclimation of flooring material;
- acclimation of subfloor/substrate;
- deflection;
- expansion space at vertical obstructions;
- repairs performed;
- measure the length of multiple individual tiles or planks in affected and unaffected areas;
- examine for broken locking mechanism in floating floors;
- movement of flooring at peak and note if only one or both sides of joint moves vertically;
- space between moldings, transitions, jambs, etc. and the surface of the flooring;
- examine uninstalled flooring material (e.g., attic stock) if available:
  - note where stored and environmental conditions; and
- confirm humidifier/dehumidifier and HVAC year-round settings.

10.12 Seams

A seam is the line along which two pieces of sheet flooring are joined.

A joint is a junction of precut surfaces butted together, such as tile, plank, or underlayment panels. Seams are in sheet products. Joints are in plank/tile products. The terms joint and seam *should* not be used interchangeably.

During a resilient flooring inspection, the inspector *should* observe, collect, and document the following:

- quality of seam cut;
- amount of seam area affected by the concern;
- description of gaps, ledging, voids, or curling at seam line;
- size of gapping, ledging, or curling:
  - width;
  - height; and
  - variation of thickness.
- ensure the seam is well bonded to the subfloor/substrate/underlayment;
- presence of bubbles or air pockets;
- if the seam was cut net, short, full, or compression fit; and
- presence of delamination.

10.12.1 Heat-welded Seam

A Heat-welded seam is produced by grooving abutting edges of resilient flooring and filling the groove with heated, fused, or melted material (usually from a weld rod) to provide a bond and seal.

The inspector *should* refer to manufacturer instructions and to the latest edition of *ASTM F1516 Standard Practice for Sealing Seams of Resilient Flooring Products by the Heat Weld Method.*

During a resilient flooring inspection, the inspector *should* observe, collect, and document the following:

- condition of weld surface:
  - ledging, concave appearance, glazed, or trimmed flush to flooring.
- depth of groove;
- width of groove;

- appearance of groove on both pieces of flooring;
- if seam is consistent in appearance;
- if chatter marks are present;
- if flooring material was cut or damaged from skiving; and
- voids in weld rod or between pieces of flooring.

The inspector *should* determine the tool used for skiving, if possible.

10.12.2 Cold-weld/Chemical-weld Seam

A Cold-weld/chemical-weld seam is produced by adjoining cut edges of resilient sheet flooring and adhering the edges with a chemical formulated to bond the edges.

The inspector *should* refer to manufacturer instructions and to the latest edition of *ASTM F693 – 01(2018) e1 Standard Practice for Sealing Seams of Resilient Sheet Flooring Products by Use of Liquid Seam Sealers.*

During a resilient flooring inspection, the inspector *should* observe, collect, and document the following:

- presence of areas of inconsistency along the seam line;
- size and shape of voids between bonded areas of the seam;
- check for seam sealer or cold-weld material on the surface of the flooring;
- amount of seam area affected by the condition;
- amount of gapping, ledging, or curling at the seam line;
- size (in width or height) of gapping, ledging, or curling;
- check that the seam is well-bonded to the substrate – if required by manufacturer;
- presence of bubbles or air pockets;
- presence of flooring adhesive within the seam sealer;
- are the two pieces of material bonded to each other;
- check if the seam is cut net, full, compression fit, or with a gap between the sheets;
- size of all gaps or voids in the seam; and
- identify seam adhesive, sealer, or cold-weld chemical.
  - method of application;
  - amount;
  - location; and
  - appearance.

10.13 Sheen Variation

Sheen variations are inconsistencies in the gloss level within or between flooring modules.

During a resilient flooring inspection, the inspector *should* observe, collect, and document the following:

- appearance compared to adjacent or unaffected areas;
- appearance compared to uninstalled material (e.g., attic stock), if available;
- maintenance products and procedures (e.g., soiling, polishes, cleaning agent residues);
- floor flatness;
- curling or doming;
- lighting conditions – eliminate shadows and glare:
  - walk around the area of concern – change in appearance due to viewing angle.
- look for texture variations;
- verify if product is installed correct side up; and
- check arrow direction on directional products, if possible.

10.14 Telegraphing

Telegraphing is the term used to describe irregularities, imperfections, patterns, etc. under the finished floor which are transmitted to the surface and become visible.

During a resilient flooring inspection, the inspector *should* observe, collect, and document the following:

- measurement of concern:
  - length;
  - width;
  - shape;
  - size; and
  - repetition/repeat pattern.
- location of where the concern(s) are visible;
- installation issues or deficiencies in subfloor/substrate/underlayment;
- visibility of concern as a result of ambient or supplemental lighting (e.g., windows);
- maintenance procedures (e.g., burnishing);
- if the visibility of the concern worsens at any time during the day or evening;
- if there are cracks or voids in the subfloor/substrate/underlayment; and
- attempt to ascertain if floor prep was performed.

11 Limitations, Complexities, Complications, and Conflicts

Floor covering inspectors may face many conditions that present numerous challenges produced by limitations, complexities, complications, or conflicts. Inspectors *should* have a thorough understanding of these issues and communicate them to all appropriate parties. Before beginning the inspection, known limitations, complexities, complications, and conflicts *should* be discussed and approved in writing by the inspector and Materially Interested Parties (MIPs).

11.1 Limitations

The act of limiting or the state of being limited, constrained, or restricted. For purposes of this Standard, limitations are restrictions that are placed upon inspectors by another party that result in a limit on the scope of work, documentation, or data collection that can affect the conclusiveness or clarity of the inspection report. Limitations may include, but are not limited to:

- inspectors are not allowed to take pictures of certain areas or items due to restrictions from an involved party;
- inspectors are prevented from performing certain tests such as product removal, sample collection, or destructive procedures;
- inspectors are prevented from contacting certain involved parties such as installers, claimants, or retailers; and
- MIPs fail to provide pertinent information by not answering questions or returning attempts at correspondence.

If an attempt to impose a limitation is initiated by any other MIP that would result in not following this Standard, the commissioning party *should* be advised. Limitations *should* be defined in writing. Limitations placed on any project that are inconsistent with this Standard can result in a conflict.

11.2 Complexities

Complexities are situations where the inspection process becomes more extensive or intricate, but a reasonably prudent inspector *should* be ready to deal with at the time of the inspection. For the purposes of this Standard, a “complexity” is any condition that causes the project to become more difficult or detailed but does not prevent the inspection from being adequately performed.

Complexities are conditions that cause a project to become more difficult or detailed, which can include, but are not limited to:

- limited access to site or party with historical perspective;
- the inspection has to be completed after normal business hours or has to be completed within a specific period;
- incomplete and/or inaccurate information provided; and
- the inspection site has building-specific uses, such as being a school, bank, hospital, or public building.

If performing destructive testing the inspector *shall* adhere to the Authorities Having Jurisdiction (AHJ).

11.3 Complications

For purposes of this Standard, a complication is generally any condition that arises after the start of the inspection and causes or necessitates a change in the scope of the inspection to include, but are not limited to:

- issues are indicated by a MIP other than the commissioning party;

- the flooring has already been removed and disposed of, or is being stored in a different environment such as a garage or warehouse;
- the floor has been repaired or evidence of the issue is not available;
- conditions of the issue are not always apparent; and
- MIP is uncooperative or unwilling to provide information.

Complications *should* be brought to the attention of the commissioning party, as it can affect the conclusiveness or clarity of the inspection report.

11.4 Conflicts

Conflicts are limitations, complexities, or complications that result in disharmony or tension between the parties involved such as: how the inspection is to be completed; what tests can be performed; or if the presence of legal counsel is required. When conflicts develop or limitations are placed on the inspector by MIPs which prevent compliance with this Standard, inspectors *should* contact the commissioning party for further instructions. Conflicts include but are not limited to:

- discussing inspection findings with non-commissioning parties;
- opposing legal counsel prevent tests required to determine cause;
- MIPs are in disagreement on who is responsible for paying for the inspection;
- perceived conflict of interest (COI); and
- inspector COI means that because of other activities or relationships with other MIPs, an inspector is unable or perceived to be unable to render impartial assistance to the client, or the person's objectivity in performing the inspection is, or might be otherwise impaired. COI is a concern when the inspector is in a situation in which their own or their affiliates' interests could prevail over the interest of the client.

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.

ANSI A108-A118-A136.1 American National Specifications for the Installation of Ceramic Tile; American National Standards Institute, Inc. - August 2024; Tile Council of North America, Inc.

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