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September 25, 2023

Ms. Nathalie Rioux
Standards Coordination Office
National Institute of Standards and Technology (NIST)
100 Bureau Drive, Stop 2100
Gaithersburg, MD 20899-2100
Email : nrioux@nist.gov

Re: Proposed Voluntary Product Standard PS 1-22, Structural Plywood (FR Document 2023-18257, Citation 88 FR 57939)

Dear Ms. Rioux:

These comments are provided on behalf of Benchmark Holdings, LLC together with its related company Benchmark International, LLC (together, "BMH"). Headquartered in Eugene, Oregon and with regional offices and staff located elsewhere around the world, BMH is an industry-leading product certification, laboratory test, and third-party inspection agency accredited pursuant to ISO/IEC 17065[1], ISO/IEC 17025[2], and ISO/IEC 17020[3] by International Accreditation Service (IAS), a subsidiary of the International Code Council (ICC). The company serves a significant number of domestic and global manufacturers producing a wide variety of goods such as solid and engineered wood products, furniture, flooring, concrete, and steel. In addition, BMH is accredited by the Japanese Ministry of Agriculture, Fisheries and Forestry (MAFF) to provide certification services pursuant to Japanese Agricultural Standards (JAS) for various types of forestry and engineered wood products worldwide, including concrete formwork and structural plywood intended for the Japanese market. BMH is also an EPA and CARB-approved Third-Party Certifier (TPC) pursuant to EPA TSCA Title VI (40 CFR Part 770) and CARB ATCM 93120 whereby the company provides formaldehyde emissions certification services for hardwood and decorative plywood, medium density fiberboard (MDF) and particleboard (PB). Consistent with this experience, BMH is deeply versed in the wide range, and global scope, of production techniques and potential end uses for both structural and decorative plywood products.

In accordance with its accreditations, BMH specializes in serving both North American and overseas manufacturers of structural plywood and structural panel products who seek to comply with the requirements specified in Voluntary Product Standard PS 1: *Structural Plywood* ("PS 1") and/or Voluntary Product Standard PS 2: *Performance Standards for Wood Structural Panels* ("PS 2"). BMH has designated a representative to serve as a Voting Member on the PS 1 and PS 2 Standing Committees, overseen by NIST and coordinated by APA. The PS 1 and PS 2 Standing Committees have the responsibility to develop, revise, and when necessary, interpret the requirements and acceptance criteria of each standard, respectively. Given BMH's participation with the committees and our work in certifying products to PS 1 and PS 2, BMH thanks the National Institute of Standards and Technology (NIST) for the opportunity to outline both areas of support for the revisions described in the proposed PS 1-22 standard as well as areas that we believe require additional clarification, specificity and/or development.

[1] ISO/IEC 17065:2012: *Conformity assessment – Requirements for bodies certifying products, processes and services*
[2] ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*
[3] ISO/IEC 17020:2012 *Conformity assessment – Requirements for the operation of various types of bodies performing inspection*

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BMH has invested significant resources to educate and diligently evaluate manufacturers located in North America and abroad who have expressed interest in producing structural plywood products that conform to PS 1. However, BMH has observed, through our onsite evaluation and certification of structural panel production facilities, the negative impacts caused by multiple ambiguities in the PS 1 standard. The vague, and in some circumstances, imprudent requirements found in PS 1 (current and proposed) hinder the application of a uniform interpretation, understanding, and effective implementation of PS 1 requirements by panel producers. Further, the PS 1 standard lacks a basis for ensuring the fair, equitable and objective validation of manufacturer conformance to such requirements by Accredited Certification Agencies, Accredited Inspection Agencies and Accredited Test Laboratories (together, "third parties"). Instead, the standard gives broad – and generally ungoverned – authority for third parties to make unilateral judgements regarding the application of the standard's text for the purposes of determining manufacturer and product conformity to the requirements.

We must note that for Brazil, in particular, BMH's efforts to certify eligible panel producers as conforming to PS 1 has required considerable time and care to educate, correct misinterpretations and, with regular frequency, to inspect the production facilities striving to achieve conformity to PS 1 requirements following the outcome of litigation brought by the U.S. Structural Plywood Integrity Coalition[4] (the "Coalition"). In its litigation, the plaintiffs alleged that the "qualified inspection and test agencies" previously operating in the region engaged in demonstrably ineffective methods to certify Brazilian manufacturers as conforming to PS 1 standards. BMH was not then, and is not now, a party to these legal proceedings nor does BMH condone the actions that were alleged in the complaint. Instead, BMH is committed to educating manufacturers, both domestic and international, who are committed to full conformity and accredited independent testing to ensure they meet those requirements. The allegations of misconduct in Brazil highlight the importance of NIST's role to ensure the adoption of clear and concise language so that any future allegations of performance failure, be it on the part of a manufacturer or a third party, can be clearly assessed and remedied according to the complaint processes published in the referenced International Organization for Standardization (ISO) accreditation standards with subsequent review by the Accreditation Body (AB). NIST should take this opportunity to adopt meaningful changes that improve the PS 1 standard and should avoid creating another standard that includes ambiguous language that can be utilized as a weapon simply by the fact that it is vague and objectively unverifiable.

As an active member of the PS 1 Standing Committee, BMH participated in the development of this proposed PS 1-22 standard. BMH representatives provided thoughtful and technically appropriate suggestions to resolve many of the historically ambiguous and often conflicting requirements defined in previous versions of the standard while also promoting the development of comprehensive, fair, and objective criteria to enhance manufacturer quality control and promote effective third-party oversight. Regretfully, the proposed PS 1-22 standard does not fully achieve these objectives. Therefore, BMH voted to reject the document in its current form at the time the proposed revisions were put to PS 1 Standing Committee for final ballot prior to publication in the Federal Register. Simply put, while many of the previous technical ambiguities and conflicting product acceptance criteria have been resolved, other proposed revisions to strengthen the manufacturer quality control and third-party oversight requirements are insufficient to ensure clear understanding of intent by all document users. This continued ambiguity prevents consistent and effective implementation by panel manufacturers as well as the objective and equitable third-party validation of manufacturer conformity to PS 1 requirements.

BMH points out that, through the provisions of Table 1 and Appendix A, the PS 1 standard is clearly intended to apply to both domestic North American and overseas producers of structural plywood products who seek to manufacture,

[4] U.S. Structural Plywood Integrity Coal. v. PFS Corp., 19-6225 (S.D. Florida).

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import, distribute and/or sell compliant products on the North American market. However, certain provisions such as the restrictions on production of Concrete Formwork, Structural I and Marine grade structural plywood constrains consumer choice for equivalent products and limits market opportunities by compliant overseas manufacturers. The arbitrary prohibition of overseas manufacturers to access to these segments of the US market quashes competition and new product development which benefits US consumers. At best, the lack of such provisions does not allow panel producers to leverage evolving manufacturing techniques or the continued shift in available sources or characteristics of the global wood supply that might otherwise permit the production of compliant structural plywood products. At worst, failure to include such provisions in this or future versions of the PS 1 standard could be perceived as a deliberate attempt to limit potential opportunities by overseas producers to manufacturer, to export, or to see these product types sold on the North American market. It is imperative that NIST, as an "unbiased coordinator in the development of the standard," takes action in coordination with the PS 1 Standing Committee and affected industry stakeholders to address these and other shortfalls. This is but one example of the shortcomings within the updated standard that Benchmark objects to – an area that clearly has tremendous economic benefit to US consumers when certifications are performed correctly.

In addition, given the structural performance needs, code requirements, and life safety issues associated with the production and use of structural plywood products in North America, it is critical that NIST promote and ensure development of provisions that are 1) comprehensive, 2) free of ambiguity or conflict, and 3) written in a manner that enhances understanding by all document users. Clarity of language is particularly vital considering that many document users read, write, or speak English as a second language. While some provisions of the proposed PS 1-22 standard move closer to this goal, other provisions are incomplete or vague and thus cannot be fairly and equitably applied by affected structural plywood producers – in any country – and the third parties charged with the responsibility to validate conformity to these requirements.

As described below, BMH submits the following additional revisions to the proposed PS 1-22 standard with the goal of enhancing manufacturer quality control and product compliance, establishing meaningful and objective criteria to be applied by third parties to validate manufacturer and product compliance, and to further resolve outstanding technical ambiguity or conflicting requirements in the proposed text. Comments are organized by topic area and are not provided in order of priority as BMH assigns equal importance to each suggested change.

BMH looks forward to the opportunity to engage and partner with NIST, the PS 1 Standing Committee and other interested stakeholders to resolve these and other proposals submitted by commentators to the proposed PS 1-22 standard.

Sincerely,

Travis R. Snapp
President/Founder
Benchmark Holdings, LLC
Benchmark International, LLC

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1. **Panel Grade Requirements:**

   a. **An alternative path to compliance by panel performance testing is needed for Concrete Formwork, Structural I and Marine plywood panel types:**

   The proposed text of PS 1-22, sections 5.2.4, 5.6.1, 5.6.4 and 5.6.5 clarifies previous restrictions on the qualification of Marine, Concrete Formwork, and Structural I plywood panels by the panel performance testing provisions specified in PS 1-22 sections 5.8.6 and 5.8.7 and earlier versions of the PS 1 standard. During the drafting and final balloting of the draft PS 1-22 standard, one or more members of the PS 1 Standing Committee proposed to modify these requirements to permit qualification through this alternative means where conformance to the prescriptive requirements specified in the PS 1 standard is not possible. BMH fully supports this proposal.

   Regretfully, provisions for the qualification of these panel types through performance testing were not included in the final text of the proposed PS 1-22 standard based on assertions from the PS 1 Standard Review Committee that, "there are no benchmarks to use." However, without such benchmarks, it is unclear how the original prescriptive specifications for these panel types could have been initially developed if no data exists to validate that such prescriptive requirements would yield a panel capable of meeting the strength and performance requirements needed for the intended end use.

   Nevertheless, if this is indeed the case, then it is imperative that NIST, in partnership with members of the PS 1 Standing Committee and other industry stakeholders, prioritize this effort to develop such benchmarks for inclusion in this or future revisions to the PS 1 standard. Factors such as fluctuations in North American plywood production capacity, dwindling availability of the domestic wood supply, and diminished raw material characteristics that negatively affect a manufacturer's ability to produce a structural plywood product capable of meeting PS 1 prescriptive requirements will only serve to limit future availability of these panel types. Both domestic and overseas producers need and deserve the opportunity to have an alternative path to product compliance, not only to assure market availability of such products, but also the health of their business.

   b. **PS 1 structural plywood panel size tolerances should align with the requirements of PS 2:**

   As in previous versions of the PS 1 standard, the proposed text of PS 1-22, section 5.10.1 defines panel size tolerances (length and width) and specifies, "*A tolerance of plus zero (0) mm, minus 1.6mm (1/6 in) shall be allowed on the manufacturer's stated length and/or width.*" Conversely, PS 2-18, the scope of which also applies to structural plywood produced according to the requirements of PS 1 and the additional requirements specified in PS 2, defines in section 5.2.1.1 the panel size tolerances (length and width) to be applied and specifies, "*A tolerance of plus or minus 1.6mm (1/16 in.) shall be allowed on the manufacturer's stated length and/or width*."

   These two requirement statements establish a conflicting set of acceptance criteria to be applied to structural plywood panels certified according to either PS 1 or PS 2. BMH notes that the text of PS 2-18 repeatedly refers to the requirement for structural plywood to conform to the requirements defined in PS 1 except as amended by the requirements of PS 2-18; therefore, it is unclear whether plywood that is produced according to the requirements in PS 2 should conform to the panel size tolerances defined in PS 1 or PS 2.

   To resolve this conflict, BMH proposes to revise the panel size tolerances specified in the final version of PS 1-22, section 5.10.1 to align with that in PS 2-18, section 5.2.1.1 [i.e., plus or minus 1.6mm (1/16 in.)]. This proposed change not only resolves the conflict in product acceptance criteria defined by the two standards, but it also aligns the panel size tolerance requirements for structural plywood to that of Oriented Strand Board (OSB) and

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other structural panel products produced according to PS 2-18. Since both plywood and OSB are increasingly used interchangeably in roof, subfloor or wall sheathing applications in modern building construction, it only makes sense that the dimensional tolerances specified in PS 1 align with that in PS 2. The proposed panel size tolerances are also likely to be more achievable by manufacturers. Beyond resolving the language conflict, the pragmatic benefits include a likely reduction in manufacturer waste and production costs associated with producing noncompliant structural plywood panels that do not meet the current, more restrictive, panel size tolerances. Manufacturers may see a decrease in quality control defects as workers will have a single production condition to follow. Furthermore, this correction should cause no negative impact to product acceptance for its intended end use.

2. Certification Requirements:

a. The use of manufacturer-generated test data for use in product performance testing or verification testing is not appropriate:

BMH strongly objects to the proposed text in PS 1-22, section 7.1 which states, "*Testing by a manufacturer's testing laboratory shall be permitted if approved by the Accredited Certification Agency*." A similar provision is included in the proposed text of PS 1-22, section 8.2.3.2.

BMH firmly opposes permitting the use of manufacturer-generated data for performance qualification testing or periodic third-party verification testing by the Accredited Certification Agency or Accredited Test Laboratory for the purposes of determining initial or ongoing product conformance to PS 1 prescriptive specification and/or mill specification requirements. Not only is this proposed provision tantamount to "the fox guarding the hen house," it poses a clear conflict of interest that could readily be exploited by unethical third parties and manufacturers to circumvent PS 1 test requirements on the basis that "the standard clearly suggests it!" Allegations of this type of impropriety were pervasive in the litigation brought by the Coalition against the "qualified inspection and test agencies" (reference PS 1-19, section 7.2) and manufacturers in Brazil, so it is particularly problematic that NIST, APA, and members of the PS 1 Standing Committee, some of whom were a party to the litigation, would endorse such language.

Elsewhere in this draft PS 1-22 standard, the language is clear that performance qualification testing and third-party verification testing must be conducted by the Accredited Test Laboratory with approval by the Accredited Certification Agency. As such, both the Accredited Certification Agency and the Accredited Test Laboratory are responsible for generating and validating the data used to qualify or verify a manufacturer's products as conforming to PS 1 prescriptive specifications or mill specification requirements. Therefore, if the use of manufacturer-generated test data for these purposes is to be promoted, then the Accredited Test Laboratory is required to take responsibility for the manufacturer-generated test data, and the manufacturer's test laboratory must comply with all ISO/IEC 17025 requirements (refer to ISO/IEC 17025:2017 sections 5.4, 6.3.5, 6.4.2, and others) as is further required in ISO/IEC 17065:2012, section 6.2.2.

In doing so, the referenced accreditation standards require the Accredited Test Laboratory and Accredited Certification Agency to validate the manufacturer's test laboratory complies with all requirements of ISO/IEC 17025 before any manufacturer-generated test data can be used. If the use of manufacturer-generated test data is to be promoted in the PS 1-22 standard for the purposes of performance qualification or third-party verification testing, an approach with which BMH firmly disagrees, then the proposed text in PS 1-22, section 7.1

must be revised to clearly state that both the Accredited Certification Agency and Accredited Test Laboratory are responsible for verifying the manufacturer's test laboratory and the data it generates fully conform to the requirements of ISO/IEC 17025. Precedent for this type of clarifying requirement statement, which reiterates obligations specified in the referenced accreditation standards that must be observed by relevant third parties, is already provided in proposed revisions to PS 1-22, sections 7.2, 7.3 and 7.4, among others, and is the minimally acceptable solution to this otherwise unworkable proposal.

If this approach is ultimately and unfortunately to be taken, then BMH believes additional safeguards must be established. BMH proposes the text of PS 1-22, section 7.1 be revised to state, "*Testing and use of data provided by a manufacturer's laboratory shall be permitted if approved by the Accredited Certification Agency provided both the Accredited Certification Agency and the Accredited Test Laboratory verify the manufacturer's test laboratory conforms to the requirements of ISO/IEC 17025 as required by ISO/IEC 17065 section 6.2.2. Such judgments shall be subject to the review and validation by the Accreditation Body who accredits the Accredited Certification Agency or the Accredited Test Laboratory.*"

3. Testing Requirements:

a. Proposed definition of "near minimum thickness" in Sections 5.8.6.1 and 5.8.7.1 does not account for manufacturer's panel design or "as-produced" panel thickness:

The proposed text of PS 1-22, sections 5.8.6.1 and 5.8.7.1 includes criteria intended to clarify the meaning and application of the historical requirement for plywood panels selected for performance qualification testing to represent the "near minimum grade and near minimum thickness" characteristics for the product type and grade. The intent of these requirements is to assure the panels selected for initial evaluation of product conformity to PS 1 acceptance criteria represent the "worst case" scenario in terms of strength and performance. BMH supports the inclusion of such clarifications.

However, BMH also notes that the proposed text in these two sections which state, "*No panel selected for testing shall have a thickness exceeding the average of the minimum and maximum thicknesses for the performance category as established in accordance with Table 10*" assumes the manufacturer has designed a panel layup/construction that, when produced, yields a final product with a median panel thickness that is consistently within the mid-range of the panel thickness requirements specified in PS 1-22, Table 10 as applicable to the performance category. Depending on the panel's design characteristics, a manufacturer may not produce panels that consistently yield a finished panel thickness meeting this criterion thus making it impossible to select panels that consistently fall within the lower half of the specified panel thickness range according to Table 10.

To address this shortcoming, BMH proposes the criteria for "near minimum thickness" be redefined to specify the following:

"*The maximum thickness of panels selected for performance testing shall not exceed the value representing the lower 50th percentile of panel thickness based on the measurement of not less than 20 panels according to the procedures specified in PS 1-22, section 5.10.2. The minimum thickness of panels selected for performance testing shall not be less than the minimum thickness requirement for the intended performance category specified in PS 1-22 Table 10.*"

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This suggested approach achieves the objective of clarifying the criteria for "near minimum thickness" and accommodates variations in manufacturer product design and production techniques while also ensuring the panels selected for performance testing represent the manufacturer's "worst case" thickness and performance characteristics as produced.

b. Minimum/maximum test speeds should be defined for bond performance shear testing:

The existing text of PS 1-19, section 6.1.2 includes a requirement that specimen preparation and testing for structural plywood bond performance, "*shall follow the principles of ASTM D906 and the procedures herein*." Among other things, the test procedures specified in ASTM D906 define requirements for test equipment, specimen preparation, test setup, and the recording of test results, to include a reference to the requirements for estimating wood failure according to ASTM D5266 as required by the provisions of PS 1-22, section 6.1 and earlier versions of the standard.

Importantly, the procedures in ASTM D906-20, section 5.1 specify that shear testing of bond performance test specimens shall be conducted using a "*…test machine [that is] adjusted to a loading rate of between 4.535 and 7.560 kg/s (600 and 1000 lb/min).*" Note 1 goes on to clarify that, "*When the testing machine is adjusted by rate of crosshead movement rather than the load application rate, an appropriate head movement rate shall be selected so as to yield an average load application rate in the 4.535 to 7.560 kg/s (600 to 1000 lb/min) range*." It should also be noted that ASTM D5266, which is referenced multiple times in the existing text of PS 1-19 and the proposed text of PS 1-22, section 6.1, states in section 4.3 that, "*In plywood manufactured from North American softwood species…"* [as is the case for all domestically produced structural plywood marked as conforming the requirements of PS 1], *"…the percentage of wood failure of Test Method D906 specimens, tested wet after either a vacuum-pressure soak-dry or boil-dry treatment, correlates with the percentage of panels that delaminate in outdoor exposure without protection*." These and other provisions of ASTM D5266 make it clear that the application of ASTM D906 is indispensable to the application of the wood failure estimation procedures defined in ASTM D5266.

Despite objections raised by BMH, the reference to ASTM D906 was removed in the revised text of PS 1-22, section 6.1.2 prior to publication in the Federal Register. Instead, the proposed text specifies the stated shear test load parameters of, "*maximum head travel of 762mm (30 in) per minute*" (reference PS 1-22, sections 6.1.3.2 and 6.1.3.3). By removing the reference to ASTM D906, the proposed text eliminates the requirement to apply the minimum and maximum load application rates and other test criteria defined therein and instead relies solely on an excessively broad load application range that, if applied incorrectly, not only reduces the consistency in execution of the test procedures by manufacturers and Accredited Test Laboratories but also increases the potential for variability in test results. Given the product compliance and life-safety issues involved, the use of explicit and uniform testing procedures should be non-negotiable.

BMH, in its work to support both North American and overseas producers of structural plywood to achieve conformity to PS 1 standards, has observed first-hand the implications of this vague and open-ended approach to test method specification. Some manufacturers, with the approval of their previous "qualified inspection and test agency," were observed to apply the text of PS 1-19 and earlier versions of the standard (which rely on the overly broad criteria for "*maximum head travel of 762mm (30 in) per minute"* or some variation thereof) as a pretense to slow the load application rate to as low as 22mm (0.86 in) per minute. This excessively slow rate of motion causes the wood fibers to "roll" instead of breaking in shear, thus increasing the resulting wood fiber failure in the test specimens. As a result, structural plywood panels tested in this manner may be subsequently

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released to the market that do not reliably meet the bond performance requirements specified in PS 1, section 5.7. Not only is this test approach inconsistent with the technically appropriate and peer-reviewed requirements of ASTM D906 (and thus ASTM D5266), but also BMH believes it is inconsistent with the intent of the PS 1 standard. Nevertheless, this approach would be allowed according to the proposed PS 1-22 text.

For reference, the text of historical versions of the PS 1 standard, including PS 1-09, specified testing was to be conducted "*at a maximum head travel of 406mm (16 in) per minute*" (reference PS 1-09 section 6.1.3.2 and 6.1.3.3), a rate that is one-half the maximum load application rate specified in PS 1-19 and the proposed text of PS 1-22. The revision history notes in PS 1-19, Appendix C neither make mention of this change nor the reason for it; therefore, it is unclear how it was determined to increase the maximum load application rate by two-fold without also specifying a converse minimum load application rate. It should also be noted BMH is not aware of any comprehensive, scientifically peer-reviewed, and published studies available to the public that conclude how test speed affects wood failure. However, in contrast/comparison, the test procedures specified in ASTM D906 have been peer-reviewed and represent a consensus among technical experts in the adhesives and wood products industry regarding the appropriate methods for conducting bond performance testing of structural and other softwood plywood products. As such, ASTM D906 is the "de facto" consensus standard for conducting shear testing of bond performance test specimens in North America. Not only should the reference to ASTM D906 be included in PS 1-22 section 6.1 as it currently appears in PS 1-19, but also PS 1-22 sections 6.1.3.2 and 6.1.3.3 should be further revised to strike the reference to "*maximum head travel of 762mm (30 in) per minute*" and instead to specify that testing shall be performed according to the load application rate and other test requirements specified in ASTM D906.

c. **PS 1-22, section 6.1.4 should be revised to reference ASTM D4442 moisture content measurement procedures:**

During the PS 1-22 drafting process, BMH suggested the procedures defined in PS 1, section 6.1.4 be replaced with a reference to the moisture content measurement procedures specified in ASTM D4442, Method B. This suggested approach not only aligns PS 1 moisture content measurement procedures with that of the technically appropriate and peer-reviewed procedures specified in ASTM D4442, but it further aligns PS 1 requirements to those specified in the current version of PS 2-18, section 7.11 and other APA-published standards including PRP 210-2019, *Standard for Performance Rated Engineered Wood Siding* (reference PRP 210-2019, section 11.12). It is notable that both PS 2-18 and PRP 210-2019 specify that structural plywood or engineered wood siding panels represented as conforming to those standards must also conform with the requirements specified in PS 1, so it only makes sense to revise PS 1, section 6.1.4 to also reference ASTM D4442, Method B for the purposes of moisture content measurement.

Despite objections, the proposed text in PS 1-22, section 6.1.4 was instead revised to specify moisture content procedures that are proprietary to the PS 1 standard. In doing so, the proposed PS 1 text remains inconsistent with equivalent test methods used in North America and elsewhere throughout the world to generate accurate, repeatable, and reproducible moisture content test results. Specifically, the proposed PS 1 text does not specify measurement equipment precision or resolution requirements, test specimen storage requirements, and does not clearly define the requirements for determining the test end point (e.g., "constant weight" or "constant mass"). Such deviations limit the repeatability and reproducibility of test results and promote ambiguity and conflict between PS 1 and other APA-sponsored standards.

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Given this, BMH reiterates its recommendation that PS 1-22 section 6.1.4. should be re-written to reference ASTM D4442. Any other solution simply does not make sense.

4. Manufacturer Quality System and Third-Party Verification Requirements:

a. A description of each required component of a manufacturer's written quality program is needed to promote understanding and equitable application by document users:

BMH supports the inclusion of minimally specified components of a manufacturer's quality program provided in the proposed revisions to PS 1-22, section 8.1. While this is an important step forward to enhance the consistency and effectiveness of manufacturer quality control activities as well as to promote objective and equitable validation of manufacturer compliance by third parties, the proposed text is incomplete. Specifically, the identified quality system components do not include a description of the intent and/or minimum requirements for each. Without such information, the proposed requirements simply cannot be uniformly understood or applied by all document users, to include those manufacturers who seek to conform to the requirements of PS 1. Furthermore, the lack of such information prevents Accredited Certification Agencies and Accredited Inspection Agencies from equitably verifying adequate manufacturer conformance to the intent of the standard.

During the PS1-22 draft review and balloting process, BMH proposed text intended to clarify the intent and, where necessary, to define minimum requirements for each manufacturer quality program component. These proposals were rejected by the PS 1 Standards Review Committee and were never incorporated into a working draft put forth to the broader PS 1 Standing Committee for a full vote on the basis that, "This is up to the Certification Agency to define the requirements within their systems, which may include different programs."[5] BMH rejects this line of reasoning on the basis that, given the outcome of litigation by the Coalition, there appears to be broad disparity in both the requirements and effectiveness of the certification programs operated by current and former agencies providing certification, inspection and test services pursuant to PS 1. This issue only begins to get resolved by defining complete, effective, fair, and equitable minimum requirements to be applied by all manufactures, both domestic and overseas.

BMH understands and supports the idea that such descriptions must account for the scope and complexity of an individual manufacturer's production process and the product specifications involved. Nevertheless, there must be agreed upon minimums that all must meet. The proposed requirements are incomplete and unworkable as they create yet more opportunities for unscrupulous manufacturers and third parties to exploit this weakness resulting in disparity and unfair or unequitable conformance to the requirements.

To resolve this issue, BMH suggests revising the proposed manufacturer quality program requirements in PS 1-22, section 8.1 to include a description of each specified quality system component as provided in Annex A of this comments document. The proposed descriptions are consistent with the requirements specified in other national and international production and quality control standards, and generally align with the practices applied by some, but not all, structural plywood and structural panel producers in North America and elsewhere around the world. To the extent there is already broad consensus regarding the uniform understanding regarding the intent and minimum requirements for each quality control program component – a situation

[5] Reference letter regarding Disapproved Comments issued to Benchmark International, LLC from the PS 1 Secretariat APA, dated June 21, 2023

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which is implied by the PS 1 Standard Review Committee's response to BMH's previous comments provided during the PS 1-22 drafting and balloting process – the proposed descriptions are not likely to pose any significant additional costs or administrative burden for manufacturers to implement and maintain. However, to the extent such broad consensus or understanding does not exist, the proposed text will significantly strengthen and promote the fair, equitable and, most importantly, effective management of manufacturer and product conformance to PS 1-22 standards.

In addition to the proposed revisions to PS 1-22 section 8.1, BMH proposes to add "Product Identification and Traceability" as an additional mandatory management system component. Given the structural performance requirements and life safety issues associated with the production and use of structural plywood products, it is critical that manufacturers define and implement a systemic and meaningful system to permit the identification, control and traceability of raw materials, work-in-process and finished goods represented as conforming the PS 1 standards. Not only are such systems important for the purposes of basic manufacturer quality control but also such product identification and traceability systems may be critical to potential future allegations of product noncompliance by the Coalition, Buyers, or other individuals that necessitate a product recall. Suggested text describing the intent and minimum requirements for a manufacturer's Product Identification and Traceability system are provided in Annex A of this comments document.

b. Proposed third party verification sampling, inspection and test requirements are inadequately defined and cannot be equitably applied:

The proposed verification sampling, inspection and test requirements defined in the proposed PS 1-22 sections 8.2 and 8.3 are vague and do not adequately define the minimum verification sampling, inspection or testing activities to be performed by manufacturers and accredited third parties. As such, the proposed text is not sufficient to promote reasonable, fair, and technically appropriate verification of ongoing manufacturer conformance to PS 1 Prescriptive Specifications or the manufacturer's proprietary Mill Specification requirements.

BMH notes that previous versions of the PS 1 standard, including PS 1-95, section 5.8.6.6 titled "Reexamination," specified requirements for quarterly reexamination, resampling, and retesting of products by third parties that were qualified by performance testing. The PS 1-95 text referred to the test requirements specified in PS 1-95, section 5.8.6.5: Mechanical Properties (Bending Stiffness and Bending Strength) for the purposes of specifying the verification inspection and testing to be performed. While PS 1-95 did not clearly address "Reexamination" requirements for other-than-span-rated panels qualified through performance testing, it is presumed the requirements in PS 1-95, section 5.8.6.6 were also intended to apply to such products.

It is unclear why these verification sampling, inspection and test requirements were removed from subsequent versions of the PS 1 standard when such requirements promoted clear definition and equitable application of the procedures. The revision history notes in Appendix C of PS 1-07, PS 1-09 and PS 1-19 do not provide any information.

During the PS 1-22 draft review and balloting process, BMH proposed language similar to that which was previously included in PS 1-95, section 5.8.6.6. should be inserted into the text of the proposed PS 1-22, section 8.2.3.2. This proposal was rejected by the PS 1 Standards Review Committee and was never incorporated into a working draft to be put forth to the broader PS 1 Standing Committee for a full vote on the basis that, "The

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language that was removed from PS 1-95 was in the context of disputes, not with regard to quality testing."[6] Again, BMH rejects this line of reasoning on the basis that the referenced PS 1-95, section 5.8.6.6 pertaining to "Reexamination" was removed from PS 1-07 and subsequent versions of the standard; however, the reinspection procedures referenced in the response by the PS 1 Standards Review Committee in the context of disputes remained (reference PS 1-07, Appendix B; PS 1-09 Appendix B, and PS 1-19, Appendix B). While informative, these reinspection procedures apply only to disputes brought by purchasers of structural plywood panels represented as conforming to PS 1 requirements and are irrelevant for the purposes of periodic verification of product conformity by the Accredited Certification Agency, Accredited Inspection Agency, and Accredited Test Laboratory as applicable.

To resolve this issue, BMH suggests revising the proposed manufacturer quality program requirements in PS 1-22, sections 8.2 and 8.3 as described in Annex B of this comments document to specify clear and meaningful verification sampling, inspection and testing requirements to be applied equitably by Accredited Certification Agencies, Accredited Inspection Agencies and Accredited Test Laboratories. Such requirements must balance what some may perceive to be the competing priorities of completeness and technical efficacy to that of expediency and cost. Thus, BMH suggests the scope and frequency of minimally required verification sampling, inspection and testing should account for the type(s) of products being produced and whether the manufacturer achieved product conformity through conformity to PS 1 Prescriptive Specifications or by panel performance testing according to the required of PS 1-22 section 5.8.6 or 5.8.7.

c. Interlaboratory Comparison Program is needed to validate performance of Accredited Testing Laboratories:

Pursuant to ISO/IEC 17025:2017, section 7.7.2, an accredited test laboratory, "*shall monitor its performance by comparison with results of other laboratories, where available and appropriate. This monitoring shall be planned and reviewed and shall include, but not be limited to, either or both of the following: a) participation in proficiency testing; or b) participation in interlaboratory comparisons other than proficiency testing.*" Section 7.7.3 goes on to state, "*Data from monitoring activities shall be analyzed, used to control and, if applicable, improve the laboratory's activities. If the results of the analysis of data from monitoring activities are found to be outside pre-defined criteria, appropriate action shall be taken to prevent incorrect results from being reported.*"

The referenced requirements in ISO/IEC 17025 are not only intended to provide an independent validation regarding the accuracy of the test results generated by an Accredited Test Laboratory and thus enable the laboratory to identify when improvement may be needed, but also to provide the basis for comparison of laboratory performance to other laboratories performing the same or similar tests. Given the structural performance needs, code requirements, and life safety issues concerned with the production and use of structural plywood products in North America, the achievement of these objectives is particularly important when the data generated by the test laboratory is used to judge product conformity to a stated PS 1 requirement.

To date, BMH is not aware of any widely available proficiency test or interlaboratory test program that includes the test methods defined or referenced in PS 1-22 section 6 or previous versions of the standard. Both NIST, as Secretariat of the PS 1 standard, and APA, as Sponsor, are uniquely positioned to partner with members of the PS 1 Standing Committee and other interested stakeholders to develop such programs. To establish both the impartiality and validity of the results, such programs should be administered by an independent agency that is

[6] Reference letter regarding Disapproved Comments issued to Benchmark International, LLC from the PS 1 Secretariat APA, dated June 21, 2023

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accredited to the requirements specified by ISO/IEC 17043 or equivalent standards. Future revisions of the PS 1 standard should make it compulsory for Accredited Test Laboratories who provide test services pursuant to the PS 1 standard to participate in the program.

Precedent for this type of government-operated or government-endorsed program can be found in the California Air Resources Board (CARB) Interlaboratory Comparison Program. In this case, CARB recognized the importance of validating the competence and accuracy of data generated by laboratories that provide formaldehyde emissions testing services of composite wood products pursuant to CARB ATCM 93120 (Title 17, California Code of Regulations). However, CARB also understood that a commercially available interlaboratory comparison program did not exist for this purpose. To resolve the issue, CARB set out to establish one. This program was subsequently endorsed by the U.S. Environmental Protection Agency (EPA) and is compulsory for all test laboratories providing test services pursuant to EPA TSCA Title VI (40 CFR Part 770) and CARB ATCM 93120.

Given the product performance and life safety issues associated with the production and use of structural plywood products in North America, it is imperative that NIST take impartial and objective steps to validate the competence of the test laboratories who provide PS 1 test services. BMH stands ready to partner with NIST, APA, members of the PS 1 Standing Committee and other interested stakeholders to explore solutions to ensure the generation of accurate, repeatable, and reproducible test data by Accredited Test Laboratories.

5. Miscellaneous Technical and Editorial Fixes:

a. The definition of the term "lot" should be clarified in PS 1-22, section 2.33:

The proposed text of PS 1-22, section 2.33 and previous versions of the PS 1 standard define the term "lot" as, "*any number of panels considered as a single group for evaluating conformance to this Standard.*" For the purposes of applying the performance testing requirements in PS 1-22, sections 5.8.6 and 5.8.7 or the proposed Quality Assurance requirements in PS 1-22, section 8, this definition is overly broad and does not provide adequate specificity to assure equitable understanding or use by manufacturers, Accredited Certification Agencies, Accredited Test Laboratories, or Accredited Inspection Agencies. Taken literally, this definition can be interpreted to mean any number of panels can be presented for inspection or testing at one time without any regard to the panel type, grade, bond type, performance category, manufacturing equipment, raw materials, or production process parameters used to produce those materials.

To resolve this ambiguity, BMH proposes to re-define the term "lot" as follows:

"*portion of production which is presented for sampling, inspection, and testing that consists of panels of the same type, within the same performance category or thickness range, and bond performance type, coming from the same production line and manufactured during a defined time period under essentially the same conditions.*"

This proposed definition, or a substantial equivalent, provides an appropriate level of clarity to the meaning of the term "lot," promotes consistent application of the product inspection and test requirements defined elsewhere in the proposed PS 1-22 standard, and better aligns to the published definitions for this term as applied by other standards bodies.

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b. PS 1-22, section 5.8.5(a) should include a cross reference to section 2.4.8 for clarity:

PS 1-22, section 5.8.5 includes proposed revisions to the text which describes the requirements for span-rated panels. Among other things, this section specifies the procedures for determining the span rating for panels that comply to the prescriptive requirements defined throughout the PS 1 standard. For clarity, BMH proposes the text of PS 1-22, section 5.8.5 (a) should be edited to add a cross-reference to the definition of the term "Prescriptive Specifications" provided in PS 1-22, section 2.4.8. This cross-reference helps clarify to the document user the applicability of the requirements in Table 6 to the development of a Prescriptive Specification for the panel type and grade to be produced according to the prescriptive requirements of the standard.

c. Additional testing requirements specified in PS 1-22, section 5.8.6.2 should be re-stated for clarity:

As in previous versions of the PS 1 standard, the proposed text of PS 1-22, section 5.8.6.2 related to panel performance testing specifies the requirements for additional testing if the results from the initial test set for concentrated load or uniform load meet the stated criteria for additional testing. The text makes it clear that, for the initial test set, "*Ten specimens (taken from at least five panels) for each test exposure condition…*" shall be evaluated.

For clarity, BMH recommends the requirements for additional testing of concentrated load and uniform load in PS 1-22, section 5.8.6.2 be revised to state, "*If additional tests are needed, they shall consist of 10 specimens taken from at least five additional panels that were not evaluated in the initial test set…*" This proposed language is intended to clarify that, in situations where additional testing is needed, the combined results of the two 10-specimen test sets represent the performance of at least 10 different panels. Neither NIST nor the PS 1 Standing Committee should finalize language that might be misinterpreted to allow testing of specimens taken from fewer panels because of ambiguity in PS 1 language. Potential loopholes like this should be firmly closed.

d. A reference to the National Design Specification equation 3.4-2 should be inserted into PS 1-22, section 6.2.4.3, Equation 1:

BMH fully supports the proposed revisions to PS 1-22 sections 6.2.4 and 6.2.5 which include the addition of the equations to be used to calculate planar shear capacity and through-the-thickness shear capacity for the purposes of determining product conformance to the requirements in PS 1-19, Table 9 (reference PS 1-22, section 6.2.4, equation 1 and section 6.2.5, equation 2). In both cases, the mathematical terms used in each formula are defined in the equation notes.

Regarding section 6.2.4, equation 1, the formula includes the term "(2/3)" which is a mathematical factor based on the engineering formula provided in the National Design Specification for Wood Construction with Commentary[7], equation 3.4-2. For clarity, BMH proposes that a reference to the National Design Specification, equation 3.4-2 be added the notes for section 6.2.4, equation 1 to clearly identify the origin of this term and provide a document citation to promote understanding by all document users.

e. The text of PS 1-22, section 8.1 should be restated for clarity:

The proposed text of PS 1-22, section 8.1 states, "*…The extent of this program is determined by the manufacturer but shall include at a minimum, but not be limited to, the following…*"

[7] 2018 National Design Specification (NDS) for Wood Construction with Commentary, © 2017 by American Wood Council.

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It is BMH's understanding that the objective of this statement is to make it clear that the written quality program content stated later in this section should be interpreted to represent the minimum acceptable quality program content allowed by the standard. However, as written, the proposed wording suggests the manufacturer has near-total autonomy over the content of its written program without regard to determinations of appropriateness by the Accredited Certification Agency. The text is also cumbersome as written and may inadvertently be interpreted incorrectly as written.

Notwithstanding the resolution of prior BMH comments regarding the minimum content requirements for a manufacturer's written quality program, BMH proposes to revise the text in PS 1-22, section 8.1 to substantially read as follows:

"*To consistently meet the requirements of this standard, manufacturers shall implement a manufacturing quality program. The manufacturer's quality program shall be documented in a Quality Manual or equivalent set of documents that is reviewed and approved for adequacy by the Accredited Certification Agency. The written program shall include, at a minimum, the following*:

[refer to Annex A of these comments for a bulleted list of proposed minimum written quality program content]

Additional manufacturer quality program content may be specified at the discretion of the manufacturer and/or the Accredited Certification Agency. The Quality Manual content and the manufacturer's conformity to the procedures and requirements defined therein shall be evaluated as part of the Accredited Inspection Agency's periodic audits. The results of this evaluation shall be reported to the Accredited Certification Agency."

This proposed revision resolves the ambiguity and awkwardness of the text mentioned earlier and further underscores that both the manufacturer and the Accredited Certification Agency are responsible for ensuring the manufacturer's written quality program is adequate to meet both the intent of the PS 1 standard as well as the scope and complexity of the manufacturer's production activities.

f. The specified verification sampling and inspection requirements in PS 1-22, section 8.2.3.2 conflict to that provided in PS 1-22 section 8.2.2:

The draft text of PS 1-22, section 8.2.2 (inclusive) specifies that sampling and "*Inspection of species, construction, panel grade, and thickness of conformity with this Standard…*" must be conducted "*…At least semi-annually (approximately every 6 calendar months).*" Conversely, draft section 8.2.3.2 specifies, "*Verification sampling and inspection shall be conducted by the Accredited Inspection Agency at least (4) times per year, either in conjunction with or independent from the quarterly audits specified in section 8.2.3.1.*"

As written, these two sets of conflicting requirements make it unclear if the referenced sampling and inspection is to be conducted at minimum quarterly or semi-annually. Notwithstanding the resolution to BMH's objections to the verification sampling, inspection and testing requirements provided in the proposed text of PS 1-22 sections 8.2 and 8.3, the conflict regarding the required frequency of verification sampling and inspection defined in the current draft of PS 1-22, sections 8.2.2 and 8.2.3.2 must be resolved.

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ANNEX A: Proposed Descriptions for Written Manufacturer Quality Program Components

NOTE: Red text represents proposed edits to the provisions of the draft PS 1-22 standard, section 8.1 pursuant to the Federal Register notice related to these comments.

- **Roles and Responsibilities for Quality Personnel:** The manufacturer shall define the organization structure, reporting relationships, roles and responsibilities for key plant management, production, quality control, and other functional groups involved in the production and quality control of the products represented as conforming to this standard. The organization chart must clearly depict the reporting relationship of the Quality Control Manager(s) and Quality Control Technician(s) relevant to other functional groups. The manufacturer shall determine and provide for the competence, awareness, and training of personnel performing work affecting product conformity to requirements. Where applicable, the manufacturer shall provide training or take other actions to achieve the necessary competence. Records shall be retained to demonstrate conformity to personnel competence, awareness, and training requirements.
- **Document and Data Control:** The manufacturer shall define or reference the methods and procedures used to manage and control quality system documents. Procedures shall define the controls needed to:
  - Approve documents for adequacy prior to use;
  - Review and update as necessary and re-approve documents;
  - Ensure that changes and the current revision status of documents are identified;
  - Ensure that relevant versions of applicable documents are available at appropriate points of use;
  - Ensure that documents remain legible and readily identifiable;
  - Ensure that documents of external origin determined by the manufacturer to be necessary for the planning and operation of the quality control system are identified and their distribution is controlled, and;
  - Prevent the unintended use of obsolete documents, and to apply suitable identification to them if they are retained for any purpose.

  Quality Control personnel or their designees shall be responsible for ensuring the manufacturer's quality system documents are established, confirmed, revised, and/or repealed as specified in the manufacturer's document control policy, as applicable.
- **Procurement:** The manufacturer shall define and implement the procedures used to ensure that purchased raw materials used in the production of the certified products conform to specified purchasing requirements. Procedures shall describe the methods used to identify, approve, and manage suppliers of critical raw materials which have been determined to have an effect, or potential effect, on the compliance or performance of the certified product. Purchasing documents shall clearly define or reference the specifications or acceptance criteria for the purchased raw materials. The manufacturer shall ensure that purchased raw materials are monitored, inspected, and/or tested upon receipt to verify conformity to specified purchase requirements. Records shall be retained to demonstrate conformity to raw material procurement and supplier management requirements.

- **Production:** Manufacturers shall define and implement appropriate production monitoring and control activities needed to assure product conformity to specifications. The type and extent of control shall be appropriate to the nature and complexity of the production process. Relevant controls for raw material receiving and storage, production planning and scheduling, work-in-process management, and finished goods production and labeling processes shall be evaluated, defined, and implemented, as applicable. Records of production monitoring and control shall provide evidence of product conformity to specifications and shall be retained.
- **Specifications:** The manufacturer shall define and implement the methods used to prepare, approve, maintain and control the product and process specifications used to manufacturer structural plywood products according to the requirements of this standard. Supported by the Accredited Certification Agency as needed, the manufacturer shall prepare a Mill Specification (see PS 1-22, section 2.35) or Prescriptive Specification (see PS 1-22, section 2.48) for each product type and grade represented as conforming to the requirements of this standard. The Mill Specification or Prescriptive Specification shall be reviewed and approved by the Accredited Certification Agency and used as the basis for ongoing production and quality control purposes. Ongoing manufacturer conformance to the product requirements defined or referenced in the Mill Specification or Prescriptive Specification shall be evaluated by the Accredited Inspection Agency and Accredited Test Laboratory according to the requirements of PS 1-22 section 8 and the results reported to the Accredited Certification Agency.
- **Inspection and Product Testing:** The manufacturer shall define or reference the methods and procedures used to sample, inspect and test raw materials, work-in-process, and finished goods to verify product conformity to mill specifications and the requirements of this Standard, as applicable. Records of quality control sampling, inspection and testing shall be retained. Records shall identify the product that is inspected/tested, the inspection/test results, the identity of the Quality Control Technician(s) who performed the inspection or test activity, and the product disposition (e.g., pass/fail), as appropriate.
- **Control of Measuring Equipment:** The manufacturer shall define the methods and procedures used to maintain and/or calibrate the key production and quality control equipment used to monitor, inspect, and/or test the certified products to verify conformity to requirements. For monitoring, inspection and/or test equipment that requires calibration, the procedures shall define or reference the equipment to be calibrated as well as the calibration frequency and methods to be used for each. Where inspection and test equipment cannot be calibrated or has otherwise malfunctioned, it shall be taken out of service until it has either been repaired or replaced. Repaired or replaced inspection and test equipment shall be subjected to additional calibration to verify proper operation before being placed back into service. Records shall be retained to demonstrate conformity to equipment maintenance and calibration requirements. In addition, where inspection and test equipment cannot be calibrated or has otherwise malfunctioned, the manufacturer is responsible for reviewing all sampling and test data generated since the time of the last known proper equipment function to determine the effect, or potential effect, that such equipment deviations may have had on the test results. Records of such data reviews shall be retained.
- **Product Identification and Traceability:** [Proposed new quality program component] The manufacturer shall define or reference the methods and procedures for the identification and traceability of raw materials, work-in-process, and finished goods manufactured according to the requirements of this standard. The manufacturer shall define and implement a method for establishing and assigning production lot/batch

numbers to each lot (see PS 1-22, section 2.33) of panels produced. Product labels or other means of identification shall enable the manufacturer to identify and trace work-in-process and finished goods back to the production records describing the operating variables and raw materials used in panel production. Product identification and traceability systems must enable the manufacturer to link the quality control inspection and test results to the lot of materials to which the results apply. Records of product identification and traceability shall be retained.

- **Control of Nonconforming Materials:** The manufacturer shall define or reference the methods and procedures to be used to identify and control raw materials, work-in-process, and finished goods determined not to conform to mill specifications or the requirements of this Standard. Procedures shall define the methods used to segregate and/or label nonconforming materials to prevent their unintended use or delivery. The means of physical isolation and/or labeling shall enable a person to readily distinguish between conforming and nonconforming materials. Physical barriers, lines of demarcation, or other means shall be used as necessary. Conforming and nonconforming materials shall not be intermingled in the same storage location. Procedures shall also define the methods used to evaluate the nonconforming products and determine the final disposition (e.g., rework, downgrade, regrade, scrap, etc.). Where the manufacturer chooses to rework a noncomplying lot, then all applicable rework activities shall be completed and the lot shall be subjected to re-inspection or re-testing as applicable to the nature of the original nonconformity. The manufacturer shall retain the original inspection/test results as well as the re-inspection/re-test results in the quality records. Structural plywood panels that do not conform to the mill specification or the requirements of this standard shall be downgraded, re-graded or scrapped and shall not be labeled, distributed, sold, or otherwise represented by the manufacturer as conforming to the requirements of this standard. Records shall be retained to provide evidence of conformity to the identification, evaluation, and final disposition requirements for nonconforming products. Where the manufacturer determines that one or more production lots do not conform to specified requirements after the affected materials have already departed the manufacturer's production facility, the manufacturer shall notify Accredited Certification Agency and all affected customers who may have received such nonconforming materials within 72 hours of becoming aware of the nonconformity. The manufacturer shall provide to the customer sufficient information to identify the nonconforming materials and shall provide instructions to the customer regarding the steps the manufacturer intends to take to deal with the nonconforming materials. Records of customer notification, to include the date of notification and the resolution of the affected nonconforming materials shall be retained.
- **Product Marking:** The manufacturer shall define or reference the methods and procedures to be used to mark, stamp and/or label certified products as conforming to the requirements of this standard. Procedures shall ensure conformity to the requirements specified in PS 1-22, section 7.5.
- **Internal Audits:** The manufacturer shall define or reference the methods and procedures used to conduct routine internal audits to verify the continued suitability and effective implementation of the manufacturer's quality control system and to identify the need for any improvements related to PS 1 production and quality control. Internal audits shall occur at least annually (approximately every 12 months) or more frequently if deemed necessary by the manufacturer. Records of the results of internal audits, to include nonconformities identified and the corrective/preventive actions taken, must be retained.

- **Product Performance Feedback:** The manufacturer shall define or reference the methods and procedures used to identify and resolve product and process nonconformities, including those arising from complaints, related to the certified products. Procedures shall define the actions needed to:
  1. Identify and record the nature of each nonconformity;
  2. React to the nonconformity and, as applicable, take action to control and correct it and deal with the consequences;
  3. Evaluate the need for corrective action to eliminate the cause(s) of the nonconformity in order that it does not recur. This shall include reviewing and analyzing the nonconformity, determining the cause(s), determining if similar nonconformities exist or could occur, and implementing appropriate actions to eliminate the cause(s). Correction and, where needed, corrective action shall be appropriate to the effects, or potential effects, of the nonconformities encountered, and;
  4. Review the effectiveness of the corrective action taken and taking additional action where necessary.
  5. Records of the nature of the nonconformities, the actions taken, and the results shall be retained.
- **Record Retention:** The manufacturer shall define or reference the methods and procedures used to identify, store, protect, and retrieve records regarding process and product compliance to the manufacturer's quality control manual, mill specification, and the requirements of this Standard. Records shall be retained for five (5) years from the date of production. Records may be in any form or type of medium.

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ANNEX B: Proposed Revisions to PS 1-22 section 8.2 Related to Minimally Required Verification Sampling, Inspection and Testing

NOTE: Red text represents proposed edits to the provisions of the draft PS 1-22 standard, section 8.2 and 8.3 pursuant to the Federal Register notice related to these comments.

8.2 Manufacturer and Product Conformity Surveillance Program ~~Inspection and Test Program~~

The Accredited Certification Agency shall establish and implement a Manufacturer and Product Conformity Surveillance Program ~~an Inspection and Test Program~~ to verify ongoing manufacturer and product conformity to the mill specification and the requirements of this Standard. At a minimum, the Manufacturer and Product Conformity Surveillance Program ~~Inspection and Test Program~~ shall include the following:

8.2.1 At least annually (approximately every 12 calendar months):

8.2.1.1 Assessment that the mill specifications for each ~~mill~~ manufacturer are appropriate for the product being certified.

8.2.1.2 A review of the manufacturer's written Quality ~~Manual~~ Control Program. Updates to the Quality ~~Manual~~ Control Program shall be prepared by the manufacturer and submitted to the Accredited Certification Agency for review and approval. If the manufacturer made no updates to the written Quality ~~Manual~~ Control Program in that year, the manufacturer needs to notify the Accredited Certification Agency that no updates were done.

8.2.1.3 Sampling for verification testing shall be conducted by the Accredited Inspection Agency for each bond performance type and panel type/grade within the scope of certification not less than once per year, either in conjunction with or independent from the annual audits specified in accordance with this section 8.2.1 or the semi-annual sampling and inspection requirements specified in section 8.2.2. The sampling requirements in Section 8.3 shall apply. Verification testing of the sampling identified above shall be performed by the Accredited Test Laboratory.

8.2.2 At least semiannually (approximately every 6 calendar months):

8.2.2.1 Inspection of species, construction, panel grade, and thickness conformity with this Standard. The sampling requirements in Section 8.3 shall apply.

8.2.3 At least quarterly (approximately every 3 calendar months):

8.2.3.1 The production and quality system of each production facility producing plywood in accordance with this Standard shall undergo on-site audits by the Accredited Inspection Agency at a minimum frequency of four (4) times per year. Quarterly audits shall include, at a minimum:

8.2.3.1.1 Verification of the appropriate use and legibility of panel marks to include, if applicable, the appropriate use of panel voiding marks as specified in Section 7.6.

8.2.3.1.2 Review of the manufacturer's in-plant quality inspection and test data to verify on-going product conformity to the grade, dimensions, panel thickness, bond performance, moisture content, and either bending stiffness or bending strength criteria specified in the manufacturer's proprietary Mill Specification and the requirements of this Standard. Where the manufacturer's inspection or test results suggest that one or more products may not reliably conform to the requirements defined in the Mill Specification or

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this Standard, the Accredited Inspection Agency shall notify the Accredited Certification Agency and initiate additional verification sampling, inspection, and/or testing as needed to verify manufacturer and product conformity to requirements.

~~8.2.3.2 Verification sampling and inspection shall be conducted by the Accredited Inspection Agency at least (4) times per year, either in conjunction with or independent from the quarterly audits specified in Section 8.2.3.1. The sampling requirements in Section 8.3 shall apply. Verification testing of the sampling identified above shall be performed by the Accredited Testing Laboratory or by the manufacturer's testing laboratory if it has been approved by the Accredited Certification Agency.~~

8.3 **Verification Sampling, Inspection and Testing**

8.3.1 Samples collected for inspection and/or testing as part of the Accredited Certification Agency's Manufacturer and Product Conformity Surveillance Program ~~Inspection and Test program~~ shall be randomly sampled and shall be representative of the population being inspected or tested. Samples shall not be selected from lots/batches produced specially for sampling and inspection/testing.

8.3.2 The sampling for the Manufacturer and Product Conformity Surveillance Program ~~Inspection and Test program~~ shall be performed by the Accredited Inspection Agency or the Accredited Inspection Agency shall witness the sampling being performed and ensure that the samples are properly identified and traceable back to witnessing documentation.

8.3.3 If the manufacturer does not produce a given product type within the scope of certification during the period between regularly scheduled sampling, the Accredited Certification Agency shall work with the manufacturer to ensure that sampling is conducted at the time of the next regular production for that product type.

8.3.4 For the purposes of the semi-annual verification sampling and inspection requirements specified in section 8.2.2 or if more frequently if determined at the discretion of the Accredited Certification Agency, at least 40 panels taken from a single lot of panels shall be sampled and inspected for each production facility and each product type/grade within the scope of certification to verify ongoing conformity to the species, construction, panel grade and thickness requirements defined in the manufacturer's proprietary Mill Specification and/or the Prescriptive Specification requirements of this standard, as applicable. At least 95% of inspected panels belonging to the lot being evaluated shall conform to the species, construction, panel grade thickness and panel dimension requirements as applicable to the product type.

8.3.5 For the purposes of the annual verification sampling and testing requirements specified in section 8.2.1 or more frequently if determined at the discretion of the Accredited Certification Agency:

8.3.5.1 For each bond performance type (e.g., Exterior or Exposure 1) within the scope of certification, at least 10 panels taken from a single lot shall be sampled and tested to verify ongoing conformity to the bond performance requirements specified in Section 5.7.1 for Exposure 1 panels and Section 5.7.2 for Exterior panels, as applicable.

8.3.5.2 For all structural plywood product types qualified by panel performance testing according to sections 5.8.6 or 5.8.7:

8.3.5.2.1 A minimum of 20 tests (specimens taken from at least 10 different panels) taken from a single lot shall be evaluated for bending stiffness both along and across the major panel axis according to the procedures specified in Section 6.2.3. At least 90% of tests shall meet the minimum quality control bending stiffness reference value (EI) defined in the Mill Specification (see Section 5.8.6.4).

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8.2.5.2.2 A minimum of 10 tests (specimens take from at least 10 different panels) taken from a single lot shall be evaluated for bending strength both along and across the major panel axis according to the procedures specified in Section 6.2.3. At least 95% of tests shall meet the minimum quality control bending strength reference value (F_bKS) defined in the mill specification (see Section 5.8.7.4).