

Impact

A regulatory impact analysis must accompany every economically significant federal rule or regulation. The Office of Policy Development and Research performs this analysis for all U.S. Department of Housing and Urban Development rules. An impact analysis is a forecast of the annual benefits and costs accruing to all parties, including the taxpayers, from a given regulation. Modeling these benefits and costs involves use of past research findings, application of economic principles, empirical investigation, and professional judgment.

Regulatory Impact Analysis of Manufactured Home Construction and Safety Standards

Michael Hollar

U.S. Department of Housing and Urban Development

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Background

In 1974, the U.S. Congress passed the National Manufactured Housing Construction and Safety Standards Act (42 U.S.C. 5401 et seq.), which authorized the U.S. Department of Housing and Urban Development (HUD) to establish and enforce construction and safety standards for factory-built manufactured housing. Congress created a single, preemptive code to both ease the burden on manufacturers and establish consumer protections. Establishment of a uniform code applicable to all states would decrease production costs while ensuring a minimum level of safety. In addition, federal superintendence of manufactured homebuilding standards reduced the burden on states that lacked resources to adequately enforce construction and safety standards for manufactured homes.

The Manufactured Housing Improvement Act of 2000 amended the original statute primarily to facilitate timely updates to the national manufactured construction and safety standards. Recognizing HUD's inability to update the standards on a timely basis, which created challenges for technological innovation within the manufactured housing industry, the Manufactured Housing Improvement Act established the Manufactured Housing Consensus Committee (MHCC).¹ The

¹ <https://www.congress.gov/congressional-report/106th-congress/senate-report/274>.

MHCC is a federal advisory committee composed of 21 voting members equally representing three primary interest groups. The interest groups are manufactured housing producers and retailers, consumers and consumer organizations, and general interest and public officials with an interest in manufactured housing. The MHCC meets regularly to consider and recommend changes in the construction and safety code. Since its inception, the MHCC has recommended five sets of updates to the manufactured housing construction and safety standards. The first three sets of updates were promulgated in 2005 (70 FR 72023), 2013 (78 FR 73965), and 2021 (86 FR 2496). On July 19, 2022, HUD published a proposed rule (FR-6233) that represents the fourth and fifth sets of MHCC-recommended updates.

Changes to HUD's Manufactured Housing Code

HUD's Manufactured Housing Code consists of six parts.

- (1) Part 3280—Manufactured Home Construction and Safety Standards.
- (2) Part 3282—Manufactured Home Procedural and Enforcement Regulations.
- (3) Part 3284—Manufactured Housing Program Fee.
- (4) Part 3285—Model Manufactured Home Installation Standards.
- (5) Part 3286—Manufactured Home Installation Program.
- (6) Part 3288—Manufactured Home Dispute Resolution Program.

This proposed rule amends Parts 3280, 3282, 3285, and 3286. The changes include recommendations from the Manufactured Housing Consensus Committee, which recommended 31 direct changes, primarily to the construction and safety standards, but also the model installation standards and installation program, and 8 changes to update or add reference standards in the “Incorporation by Reference,” or IBR, provisions, which are in 24 CFR § 3280.4.² Many of the proposed changes would codify existing building practices or conform HUD standards to other existing residential building codes. The sole change to 24 CFR Part 3282 is related to the codification of multi-unit homes.

Of the 39 proposed updates, 22 updates do not have a measurable cost impact. These provisions generally align with or streamline current practice or provide flexibility and increase options for manufacturers, installers, and consumers. Thirteen provisions are expected to have measurable or notable costs or benefits by directly affecting production or installation. Finally, four updates will reduce costs by eliminating the need for manufacturers to apply for an exemption to the current standards through the Alternative Construction process. These proposed updates are already in effect for a limited number of homes, as indicated below. Codifying these changes relieves manufacturers from the administrative burden of applying for an Alternative Construction letter and complying with its requirements.

Proposed Code Revisions that Affect Costs or Benefits, or Both

The effect of each proposed code change was evaluated using two reference homes. The smaller home is a one-bedroom, one-bathroom, 493-square-foot (37 feet long and 13 feet 4 inches

² The eight IBR changes include 88 updated or added reference standards.

wide) single-section dwelling. The larger home is a two-bedroom, one and a half-bathroom, 2,000-square-foot (68 feet by 30 feet 4 inches) double-section structure. Consistent with recent production and shipment sizes reported in the U.S. Census Bureau's 2021 Census of Manufactured Housing, the cost estimates assume that 48 percent of shipments are the small reference home, and 52 percent are the large reference home. Given the relative steadiness of production and shipments in recent years, this analysis assumes annual production of 105,400, which is the number of shipments during the 12 months from December 2020 through November 2021.

This analysis presents costs and benefits for a cohort that represents a single annual production year. The change in production and installation costs are one-time, upfront costs in the year of production or installation. The structural and safety-related benefits occur each year during the life of the home. Thus, the change in one-time, upfront costs is compared with the net present value of the stream of benefits during the life of the homes produced in a single production year.

Among the code changes and updates proposed in this notice, only the following 13 changes are expected to materially affect costs or benefits, or both. Exhibit 1 lists the expected costs and benefits resulting from these updated standards for a representative production year, as explained previously. The costs are one-time, upfront increases that occur only at the time of production or installation, but the benefits continue to accrue during the life of the home. Exhibit 2a lists the annual stream of safety-related benefits per production year. These benefits occur each year during the life of the home. Exhibit 2b provides the net present value of the stream of benefits during 30 and 45 years. Manufactured homes have an expected life of 30 to 55 years. Thus, the net present value of benefits calculated for 30 years should be considered a minimum.

Materials: § 3280.304(a)

This rule change allows builders to use lumber with a moisture content above 19 percent for exterior purposes (porches and decks). Higher moisture content in pressure-treated lumber used on the home exterior is not a safety or structural concern; however, allowing manufacturers to use lumber with a higher moisture content avoids the need to either purchase kiln-dried lumber or wait approximately 3 weeks for the lumber to dry naturally. Using lumber with a higher moisture content will decrease the cost of homes with inset porches by \$66 to \$201. HUD estimates that between 10 and 30 percent of manufactured homes have inset porches. In aggregate, this provision is expected to reduce upfront production costs by \$702,596 to \$6,355,620 per production year. In addition to the cost savings, this provision may also result in time and material storage savings, because manufacturers will not need to dry lumber or store the lumber and wait for it to dry.

Circulating Air Systems: § 3280.715(a)

This rule change permits supply air ducts that are within 3 feet of the furnace to be made of less fire-resistant material if those ducts are rated to withstand the maximum discharge air temperature of the equipment. This rule change will decrease upfront production costs by \$68 per home. HUD estimates that between 10 and 30 percent of manufactured homes will be affected. In aggregate, this provision is estimated to reduce costs between \$711,450 and \$2,134,350 per production year.

Exhibit 1

Change in One-Time, Upfront Production or Installation Costs per Production Year

Description	Small Home				Large Home				Estimated Aggregate Cost per Production Year	
	# Affected		Cost Estimate		# Affected		Cost Estimate		Low	High
	Low	High	Low	High	Low	High	Low	High		
1 Moisture content of treated lumber used for exterior purposes.	5,015	15,045	(\$67)	(\$201)	5,525	16,575	(\$67)	(\$201)	(\$702,596)	(\$6,355,620)
2 Air ducts temperature ratings.	5,015	15,045	(\$68)		5,525	16,575	(\$68)		(\$711,450)	(\$2,134,350)
3 Resistance to elements and use—water resistive barrier.	35,106	42,629	\$323	\$670	552	11,050	\$323	\$670	\$11,522,296	\$23,902,532
4 Kitchen cabinet fire protection.		50,151	(\$4.35)	\$9.79		55,249	(\$6.09)	\$18.27	(\$554,623)	\$1,500,375
5 Maximum distance of fixture trap to vent.						55,249	(\$261)		(\$14,419,913)	(\$14,419,913)
6 Under-chassis line-voltage wiring protection.	5,015	15,045	(\$195)		5,525	16,575	(\$195)		(\$2,055,300)	(\$6,165,900)
7 Reference to AWC National Design Specification for Wood Construction.	25,076	40,121	\$91		27,624	44,199	\$704		\$21,723,904	\$34,758,247
8 Structural design requirements for attics.	5,015	15,045	(\$104)	(\$151)	5,525	16,575	(\$617)	(\$766)	(\$3,930,419)	(\$4,989,336)
9 Water system piping testing procedures.	12,538	30,091	(\$1.46)		13,812	33,149	(\$1.46)		(\$38,471)	(\$92,330)
Total									\$10,833,428	\$26,003,706
<i>Weighted Average per Unit</i>			\$78.48	\$104.97			(\$2.20)	\$17.64	\$34.12	\$57.55

AWC = American Wood Council.

Source: HUD calculations

Exhibit 2a

Increase in Annual Benefits

Benefits	Small Home				Large Home				Total Annual Avoided Cost per Production Year	
	# Affected		Avoided Cost		# Affected		Avoided Cost		Low	High
	Low	High	Low	High	Low	High	Low	High		
Resistance to elements and use – water resistive barrier.	667	810	\$4,082		10	210	\$7,041		\$2,793,104	\$4,201,304
Kitchen cabinet fire protection.										
Fire Damage Avoided		50,151	\$3.61			55,249	\$3.28		\$181,176	
Deaths Avoided		50,151	\$92.52			55,249	\$83.98		\$4,640,000	
Total									\$7,614,280	\$9,022,480
<i>Weighted Average per Unit</i>			\$74.71	\$80.38			\$44.26	\$56.90	\$58.80	\$68.11

Source: HUD calculations

Exhibit 2b

Net Present Value of Increase in Annual Stream of Benefits per Production Year

Description	Net Present Value of Benefits over 30 Years				Net Present Value of Benefits over 45 Years			
	3% Discount Rate		7% Discount Rate		3% Discount Rate		7% Discount Rate	
	Low	High	Low	High	Low	High	Low	High
Resistance to elements and use – water resistive barrier.	\$77,789,818	\$117,009,132	\$70,520,477	\$106,074,805	\$115,362,538	\$180,028,692	\$103,014,713	\$169,094,365
Kitchen cabinet fire protection.								
Fire Damage Avoided	\$5,045,886		\$4,574,356		\$7,483,065		\$6,682,115	
Deaths Avoided	\$129,227,110		\$117,151,031		\$191,644,199		\$171,131,569	
Total	\$212,062,814	\$251,282,128	\$192,245,863	\$227,800,191	\$314,489,802	\$379,155,956	\$280,828,397	\$346,908,049

Source: HUD calculations

Installation of Appliances: § 3280.709(a)

This change removes the requirement that installers leave the appliance manufacturer's instructions attached to the appliance. The code is currently unclear on how appliance instructions are to be provided to the homeowner, resulting in hard copy duplication. Currently, instructions are supplied with each appliance and additionally with the homeowner's manual. This proposed change eliminates the unnecessary duplication of providing two sets of appliance instructions to the homeowner.

Resistance to Elements and Use: § 3280.307

This change requires that the exterior wall envelope include a water-resistive barrier behind the exterior cladding and a means of draining water that enters the assembly to avoid water damage to the home. Water-resistive barriers are common in higher-end manufactured homes; this change will primarily affect lower-end and smaller manufactured homes. HUD estimates that this change will affect 70 to 85 percent of small, manufactured homes and 10 to 20 percent of large, manufactured homes. The upfront cost of including a water-resistive barrier ranges from \$323 to \$670 per home. In aggregate, this change will increase upfront costs from \$11,522,296 to \$23,902,532 per production year.

This change provides ongoing benefits to the homeowner during the life of the home by adding a second layer of protection from bulk water damage. Although the amount of water damage specific to manufactured homes is not available, the Insurance Information Institute reports that between 2015 and 2019, an average of 1.9 percent of homeowners annually filed a homeowners insurance claim related to water damage or freezing. Applying this percentage to the affected homes yields between 677 and 1,020 manufactured homes annually that would avoid water damage due to this requirement (see exhibit 2a). The average claim severity for water damage and freezing from 2015 to 2019 was \$11,098. This figure represents 5.1 percent of the median value of the home based on the 2019 American Community Survey, which reports a median home value of \$217,500. According to the Census of Manufactured Housing Survey, the average sales price is \$80,000 for a single-section manufactured home and \$138,000 for a multisection home as of August 2021. Thus, the average expected avoided damage per home per year totals \$4,080 for small homes and \$7,041 for large homes. These savings occur as a stream of benefits for the life of the home. Discounting this stream of ongoing annual benefits per production year totals between \$77.8 and \$169.0 million.

Flame Spread Limitations and Fire Protection Requirements: § 3280.203 and § 3280.204

This change updates the flame spread rating requirements for various products used in manufactured home construction, and it contains requirements that are specific to kitchen cabinets. This update stipulates that nonhorizontal surfaces of cabinets above the bottom of the range hood do not have to be surfaced and protected with "limited combustible material." The rule also requires that, where range hood finish materials are installed, the finish material's flame spread rating shall not exceed 200, and gypsum board (or a material of equivalent limited combustibility) that is at minimum 5/16 inch thick must separate the finished material from the metal range hood.

This update will decrease upfront production costs related to not having to install "limited combustible material," saving \$4.35 per small home and \$6.09 per large home. Installing an under-

cabinet range hood instead of a wall-mounted range hood could offset these cost savings. In this scenario, total upfront costs would increase by \$9.79 per small home and \$18.27 per large home. In the aggregate, the change in upfront costs at the time of production is expected to range from a decrease of \$554,623 to an increase of \$1,500,375 per production year.

This code change will provide a stream of benefits to homeowners during the life of the home by increasing fire safety where range hood finishes are used. According to the National Fire Protection Association, cooking equipment causes 1,700 fires in manufactured homes annually (Hall, 2013). Direct property damage from these fires totals \$14 million annually (\$8,235 per fire), resulting in 31 deaths and 105 injuries. According to the 2019 American Housing Survey, 8.262 million manufactured homes were in the United States. Thus, new annual production represents 1.28 percent of the existing manufactured housing stock. Based on annual production of 105,400 units, fire is expected to damage 22 manufactured homes annually in each production year. Using the average of \$8,235 per fire, the aggregate annual value of fire damage that would be avoided by this code change is \$181,176 per production year. Similarly, based on 31 annual deaths from fire, or 0.0182 deaths per fire, 0.4 lives annually are expected to be saved from this rule change per production year. The value of a statistical life totals \$11.6 million, and avoiding 0.4 deaths totals \$4.64 million (DOT, 2021). Exhibit 3 shows the net present value of avoided fire damage and lives saved during 30 and 45 years for 3 and 7 percent discount rates. This value represents the stream of benefits per production year.

Exhibit 3

Upfront Cost Savings per Production Year from Provisions that Eliminate Need for Alternative Construction (AC) Letters

	Accessible Shower	Tankless Water Heater	Single Package Vertical Units	Doors & Windows	Total
Avg Annual AC Requests	14	7	13	2	
Approximate Units per Request	250	500	250	2,000	
Hours					
Prepare request	20	20	20	20	
Recordkeeping	2	2	2	2	
DAPIA Review	4	4	4	8	
IPIA Inspection (5 hrs per home)	1,250	2,500	1,250	10,000	
In-Plant QC (0.5 hrs per home)	125	250	125	1,000	
Total Hours	1,401	2,776	1,401	11,030	
Average Hourly Wage¹					
Civil Engineer	\$45.88	\$45.88	\$45.88	\$45.88	
CAD Operator	\$27.21	\$27.21	\$27.21	\$27.21	
Quality Auditor or Building Inspector	\$31.96	\$31.96	\$31.96	\$31.96	
Total Savings Per Production Year	\$22,585	\$106,480	\$62,535	\$370,333	\$561,933
Savings per home	\$90	\$213	\$250	\$185	

CAD = computer-aided design. DAPIA = Design Approval Primary Inspection Agency. IPIA = In-Plant Inspection Agency. QC = quality control.

¹ Bureau of Labor Statistics (BLS) mean hourly wage, Occupational Employment and Wages, May 2020.

Source: HUD calculations

Vents and Venting, Size of Vent Piping: § 3280.611(c)

This rule change increases the maximum distance of a fixture trap to the vent, which will align the HUD Code with the International Plumbing Code. Maximum distances increased by as little as 6 inches for a 1¼-inch diameter drainpipe and as much as 6 feet for a 3-inch diameter drainpipe. This change is expected to only affect homes with larger master bathrooms designed with two vents or homes with two adjacent bathrooms, which is less common. Smaller homes typically have one bathroom and one vent pipe. In homes with larger master bathrooms that require two vent pipes, this change will eliminate the need for a second vent, reducing the cost by \$261 per home. In aggregate, this update will reduce costs by \$14,419,913 per production year.

In addition to decreasing costs, this change also provides more flexibility in designing circuit vents. The increased maximum distances allow the designers to locate the vent pipe in the walls to accommodate a preferred fixture layout, whereas previously, the layout may have required modification due to shorter permissible distances and floor-plan constraints.

Wiring in Wet Locations: § 3280.808(k)

This change allows for any approved conduit or raceway where outdoor and under-chassis line voltage wiring is exposed to moisture or physical damage. Previously, only rigid metal conduit was permitted. This change affects wiring installed as an add-on at the factory or in the field during closeup and will decrease upfront costs due reductions in both material and labor. The decrease in cost ranges from \$57 to \$138 per home. HUD estimates that between 10 and 30 percent of homes will realize these savings. In the aggregate, expected savings will range from \$2,055,300 to \$6,165,900 per production year. In addition to lower upfront production costs, this change may also streamline site installation of homes that require additional wiring.

Multi-Unit Dwelling Manufactured Homes³

This change allows for the construction of up to three units in a single manufactured home. Currently, the code allows for a single dwelling unit. Although HUD has not estimated the number of multi-unit homes to be produced each year because of this change, there will be an overall, upfront cost savings in constructing and installing two- or three-multi-unit homes compared with two or three separate single-unit homes.

Reference to American Wood Council National Design Specification for Wood Construction: § 3280 Subpart A—General (§ 3280.4) and § 3280.304 Materials

This rule change updates the reference to the National Design Specification (NDS) for Wood Construction from the 2001 to the 2015 editions. The primary change is the reduction to design values for visually graded Southern Yellow Pine lumber, which affects either the grade of wood needed for the structural element (floors, walls, and so on) or the amount of wood necessary for

³ § 3280 Subpart A—General (§§ 3280.2, 3280.4 and 3280.5); § 3280 Subpart B—Planning Considerations (§§ 3280.103(b), 3280.105(a), 3280.109(a) and 3280.115); § 3280 Subpart C—Fire Safety (§§ 3280.203, 3280.204, 3280.214, 3280.215, and 3280.216) § 3280 Subpart F—Thermal Protections (§§ 3280.510 and 3280.511); § 3280 Subpart G—Plumbing Systems (§§ 3280.603 and 3280.609(a)(2)); § 3280 Subpart H—Heating, Cooling and Fuel Burning Systems (§ 3280.705(j)); § 3280 Subpart I—Electrical Systems (§§ 3280.802 and 3280.805); § 3285.603 Water Supply.

the structural element, based on the engineering analysis using the appropriate design values for the species and grade of lumber the home manufacturer selects.

MHCC adopted this change to keep the structural integrity of manufactured homes equivalent to site-built homes. In 2010, the Southern Pine Inspection Bureau (SPIB), an independent nonprofit industry inspection agency that sets standards and conducts testing of southern pine lumber, discovered that the strength of southern pine lumber decreased. Following further testing in 2011 and 2012, SPIB revised design values for Southern Yellow Pine effective for 2013. The site-built construction industry quickly adopted these design values to avoid structural failure. Further testing since the adoption of the lower design values in 2013 confirms that the revised standards are appropriate and needed.

Following SPIB approval in 2012, the MHCC's Structure and Design Subcommittee considered the best options for dealing with the reduced design values and, in a subcommittee meeting on July 15, 2015, recommended that the full committee approve and update the referenced standard. The full MHCC approved the lower design values on December 4, 2015.

Overall, the reduced design values for the specific lumber will increase production costs by \$91 per small, manufactured home and \$704 per large, manufactured home. HUD expects that this change will affect between 50 and 80 percent of homes shipped annually; the aggregate cost of this change will range from \$21,723,904 to \$34,758,247 per production year.

Floor joists and other structural wood elements designed using the older, higher design values will not perform as well as the same joist or structural element designed using the newer, lower design values. This performance is because the newer design values account for the different strength characteristics of lumber harvested today, which uses trees matured with speed growth techniques. Without adequately accounting for the reduction in strength characteristics, failures or inadequate performance may occur. SPIB determined that the likelihood of this potential failure occurring was high enough to warrant lower design values for the site-built industry. Consequently, the site-built construction industry adopted this change through state and model codes, following the timely adoption of more recent editions of the NDS dating back to 2012.

Although HUD and the industry both acknowledge the potential for increased cost, updating to the more recent NDS provides parity with the site-built industry and will ensure that floors and other structural elements using visually graded Southern Yellow Pine lumber in manufactured homes have the equivalent strength of floors and similar components in site-built homes. Absent this change, a market failure of asymmetric information will continue to exist where the consumer is unaware of the home's weaker structural integrity. This market failure does not exist in site-built housing, because the lower design values were adopted in 2013. HUD does not have statistics on the number of homes that have needed repairs or reinforcement due to weaker floors or structural elements because the manufacturer either corrects these weaknesses, following a consumer complaint and are, therefore, not reported to HUD, or the structural systems have not experienced the design loads for which the homes were designed and may perform acceptably until such a design event happens.

Number and Location of Exterior Doors: § 3280.105(a)(2)(i)

The manufactured housing code requires each home to have two exit doors that must be remote from each other. This change allows two exit doors to be in a group of rooms in an open floor plan rather than requiring the exit doors to be in separate rooms. This change could nominally affect the production cost of a manufactured home by reducing the number of interior walls, but more importantly, this change will increase design flexibility and increase consumer choice.

Structural Design Requirements: § 3280.305(k)(2)

This change amends the definition of attic area to clarify which portions must be designed for storage, thus higher loads. Due to the current ambiguous definition, many attics are designed and built to support unnecessarily high loads. The expected decrease in cost for small, manufactured homes ranges from \$104 to \$151 per home, and the decrease for large, manufactured homes ranges from \$617 to \$766 per home. In aggregate, this change decreases upfront costs between \$3,930,419 and \$4,989,336 per production year.

Water Supply: § 3285.603(e)(1)

This change revises the requirements in the water system testing procedure section to be in accordance with the piping manufacturer's instructions, which may be lower than the current requirements in the HUD code. Current code requires water pressure of 80 pounds per square inch (psi) for at least 15 minutes, whereas some manufacturers recommend pressure of 80 psi for 10 minutes. This change will decrease the installer's onsite testing by about 5 minutes per home. According to the U.S. Bureau of Labor Statistics, the average wage of a manufactured home installer is \$17.48 per hour. HUD estimates that this change will affect between 25 and 60 percent of homes per production year. In aggregate, this change will decrease upfront costs between \$38,471 and \$92,330 per production year.⁴

Instructions: § 3280.711

This change enables manufacturers to provide appliance operating instructions with a quick response code as an alternative to the current option of paper instructions. The quick response code would be permanently affixed to appliances to ensure that the instructions match the appliance. This change would have a minimal impact on costs but is expected to benefit consumers by providing virtual instructions that are less likely to be lost.

Exhibit 1 shows, as previously discussed, that three proposed changes have the potential to increase production costs. The weighted average per-unit increase in costs ranges from \$34.12 to \$57.55. Producers likely would pass on some or all these costs to the consumer in the form of higher retail prices, likely reducing the number of manufactured homes purchased. The extent of this decrease

⁴ This provision may also reduce the amount of copper piping used in the home, which could reduce the negative health effects of copper in areas with corrosive water. For a discussion of copper pipe-related health effects, see "Review of the National Primary Drinking Water Regulation: Lead and Copper Rule Revisions," 86 FR 71574. <https://www.govinfo.gov/content/pkg/FR-2021-12-17/pdf/2021-27457.pdf>.

in purchased homes depends on the price elasticity of demand.⁵ Three studies estimate the price elasticity of demand for manufactured housing to be about -2.4,⁶ which means that a 1-percent increase in the retail price would decrease sales of manufactured homes by 2.4 percent. Based on the overall weighted average per-unit cost increase, the average sales price of \$111,900, and the annual average production of 105,400, the decrease in homes purchased annually ranges from 77 to 130 (U.S. Census Bureau, 2021).

Elimination of Alternative Construction Letters

To encourage innovation in the design and construction of manufactured homes, HUD allows manufacturers to request approval to deviate from the HUD code. To do so, a manufacturer must submit detailed design information to a Design Approval Primary Inspection Agency, or DAPIA, for review. The design information and DAPIA review is then submitted to HUD. If approved, HUD issues an Alternative Construction (AC) letter explaining the terms, including the number of homes and the time that homes may be shipped with the requested deviation. Each home typically requires an additional onsite inspection after the home is shipped and sited. On request, manufacturers must send an inspection report to HUD for each home, and manufacturers are responsible for providing cumulative shipment reports annually under each approved AC letter. Although this process was developed to encourage innovation, in recent years, HUD has issued AC letters to compensate for the slow regulatory process of approving updates to the construction and safety standards. In 2020 and 2021, HUD issued three industrywide AC letters to accommodate supply-chain shortages.⁷

This proposed rule includes three updates and one new reference standard to eliminate the need for the most currently issued AC letters. The primary benefit of these provisions is the decrease in administrative costs, which are explained in the following sections. The new ease of providing these features possibly increases the demand for manufactured housing. This expected potential increase will not have a significant effect on the demand for manufactured housing, but rather on the features chosen by households that already planned to purchase a manufactured home.

Shower Compartment: § 3280.607(b)(3)

This update will allow for roll-in and transfer-type shower compartments (accessible bathing fixtures). The current code requires the shower compartment to contain a minimum dam or threshold height. Since establishing the AC letter process in 1994, 74 manufacturers have applied for and received permission to deviate from § 3280.607(b)(3) and include accessible roll-in shower compartments. Currently, 31 active AC letters allow for a maximum of 31,100 homes to be built with accessible roll-in shower compartments. Annually, HUD approves approximately 14 requests,

⁵ The change in the equilibrium quantity of homes sold also depends on the price elasticity of supply. The combination of the two elasticities determines how much of the cost increase can be passed to the consumer. This analysis, however, assumes that the full cost is passed to the consumer. The decrease in the quantity demanded should thus be regarded as an upper bound.

⁶ See Morgan and Belknap (1982), Gates (1984), and Meeks (1993). In contrast, Marshall and Marsh (2007) estimate the price elasticity of demand for manufactured housing to be -0.48.

⁷ Industrywide AC letters addressing supply-chain problems were issued on December 16, 2020 (20-IW1-AC), May 5, 2021 (21-IW1-AC), and December 15, 2021 (20-IW2-AC).

each allowing an estimated 250 units to contain accessible shower compartments. This update will reduce the administrative cost of applying for an AC letter and the associated review and inspections. As exhibit 3 shows, this update to the code will eliminate the need to apply for an AC letter and save manufacturers \$22,585 annually, or \$90 per home.

Incorporation by Reference and Minimum Standards: § 3280.4 and § 3280.703

This provision adds a new reference standard: The 2012 version of Underwriters' Laboratories, or UL, 60335-2-40 *Household and Similar Electrical Appliances—Safety—Part 2–40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers*. Adding this new reference standard will allow manufacturers to install tankless water heaters. Homeowners are already requesting tankless water heaters, because they are more energy-efficient than traditional storage tank heaters. HUD issues approximately seven AC letters annually, each allowing an estimated 500 units to contain tankless water heaters. Currently, 14 active AC letters allow the production of 58,350 units to contain tankless water heaters. As exhibit 3 shows, allowing tankless water heaters without the need to apply for an AC letter will save manufacturers \$106,480 per year, or \$212 per home.

Appliances, Cooling: § 3280.714 0

This change updates the version of the reference document from 1989 to 2008: The American National Standards Institute (ANSI) and Air-Conditioning, Heating, and Refrigeration Institute Standard 210/240-2008 Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment. This update will allow for single package vertical units (SPVU), both air conditioners and heat pumps, that heat and cool specific rooms or areas, thus lowering energy bills by reducing the use of larger systems. HUD issues approximately 13 AC letters annually, each allowing an estimated 250 units to contain tankless water heaters. Currently, 24 active AC letters allow for the production of 53,200 units to contain SPVUs. As exhibit 3 shows, allowing SPVUs without the need to apply for an AC letter will save manufacturers \$62,535 per year, or \$250 per home.

Requirements for Windows; Egress Window Systems; Exterior Passage Doors: § 3280.403, 3280.404, and 3280.405

This change updates the reference to three standards: AAMA⁸ 1701.2 from the 1995 version to the 2012 version; ANSI Z97.1 from the 2004 version to the 2009 version; and AAMA 1702.2 from the 1995 version to the 2012 version. The change also adds AAMA/WDMA⁹/CSA¹⁰ 101/I.S.2/A440-11 North American Fenestration Standard as an alternative compliance path in the sections of the HUD code that govern windows, sliding glass doors, skylights, egress windows, and swinging exterior passage doors. Currently, manufacturers can only use windows and doors labeled specifically for use in manufactured homes. Due to supply-chain shortages that the COVID-19 pandemic caused, manufacturers requested relief from this overly restrictive requirement. In response, HUD issued two successive industrywide AC letters that removed the requirement that manufacturers use only windows and doors that were certified for use in manufactured homes.

⁸ AAMA = American Architectural Manufacturers Association.

⁹ WDMA = Window & Door Manufacturers Association.

¹⁰ CSA = Canadian Standards Association.

The industrywide AC letters allow for unlimited production, but HUD estimates that about 2,000 units per year are produced under this authority. As exhibit 3 shows, allowing these door and window features without the need to apply for an AC letter will save manufacturers \$370,333 per year, or \$185 per home.

Summary

This proposed rule updates various provisions of HUD's manufactured housing code. Most of these proposed code changes will not affect production or installation costs or provide measurable benefits. Thirteen proposed changes will affect costs for producers or installers, provide benefits to homeowners, or both. Finally, four proposed changes will eliminate the need for producers to apply for permission to provide features that are common in site-built homes and currently requested by consumers. Exhibit 4 compares the total costs and benefits of this proposed rule. The changes in costs are all one-time, upfront costs that occur at the time of production or installation. Homeowners and occupants realize the safety and structural benefits each year during the life of the home. A range of the net present value of the stream of benefits is presented during the life of the home, assuming a life of between 30 and 45 years. These periods correspond to the minimum expected life of a manufactured home, 30 years, and the average expected life of a manufactured home, 45 years.

The net increase in upfront production costs ranges from \$10.8 to \$26.0 million per production year. Of the 13 provisions that affect production or installation costs, only two definitively increase costs, and one has an ambiguous impact on costs. Two of these provisions provide ongoing safety and structural benefits during the life of the home. The net present value of the stream of benefits from the two provisions that increase cost also produce benefits that range from \$192.2 to \$251.3 million when annualized over 30 years and from \$280.8 to \$379.2 million when annualized over 45 years. Finally, savings per production year from the reduced administrative burden that is associated with AC letter application and compliance totals \$0.561 million per production year. Overall, this proposed rule produces net benefits ranging from \$166.8 to \$368.9 million per production year.

The extent to which cost increases are passed to the consumer or borne by the producer will depend on the elasticities of supply and demand. Morgan and Belknap (1982) find a high own-price elasticity for manufactured housing and a high cross-price elasticity of substitute housing, rental apartments, and conventional single-family housing. Thus, price changes can have a large effect on the quantity of manufactured homes demanded, which would discourage producers from fully passing increased costs to the consumers and may encourage passing of cost savings through lower sales prices. No empirical studies estimate the supply elasticity of manufactured housing; however, using typical estimates of site-built elasticity of supply, slightly more than one-half of the cost increase would be passed to the consumer in the form of higher retail prices.

Exhibit 4

Costs and Net Present Value of Benefits

Comparison of Upfront Costs and Net Present Value of Benefits								
	Net Present Value Calculated over 30 Years				Net Present Value Calculated over 45 Years			
	3% Discount Rate		7% Discount Rate		3% Discount Rate		7% Discount Rate	
	Low	High	Low	High	Low	High	Low	High
Net Increase in Costs of Production/Installation								
Table 1. Upfront Increase in Production/Installation Costs	\$10,833,428		\$26,003,706		\$10,833,428		\$26,003,706	
Benefits								
Table 2b. Net Present Value of Benefits	212,062,814	251,282,128	192,245,863	227,800,191	314,489,802	379,155,956	280,828,397	346,908,049
Table 3. Savings from Elimination of AC Letters per Production Year	561,933		561,933		561,933		561,933	
Net Benefits (Tables 2b + 3 minus Table 1)	\$201,791,319	\$241,010,633	\$166,804,091	\$202,358,419	\$304,218,307	\$368,884,461	\$255,386,625	\$321,466,276

AC = Alternative Construction.

Source: HUD calculations

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Author

Michael Hollar is a Senior Economist in the Public Finance and Regulatory Analysis Division of the Office of Policy Development and Research, U.S. Department of Housing and Urban Development.

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