Residential Fire Sprinklers

Market Growth and Labor Demand Analysis

By

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www.ResidentialFireSprinklers.com

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Russ Leavitt is the Chairman and CEO of Telgian Corporation. Telgian is an international firm providing fire, life safety, and asset protection engineering and consulting services. Under his direction, Telgian provides a wide range of fire protection and life safety services including fire systems engineering and design, code consulting, loss control engineering, installation, and the inspection and testing of systems.

He is a graduate of the University of Nevada, Las Vegas and holds a Level IV certification from NICET in Fire Sprinkler Layout and a Certified Fire Protection Specialist (CFPS). He is a licensed contractor and has over 27 years of experience in the design, installation, and testing of fire protection systems. Russ has worked on projects throughout North, Central, and South America, the Far East, and Europe.

He serves on the NFPA 25 technical committee and the NFPA 5000 (building code) correlating committee. Russ conducts seminars internationally on a variety of fire and life safety related subjects and has authored a number of articles and training materials. Russ is a member of NFPA and SFPE.
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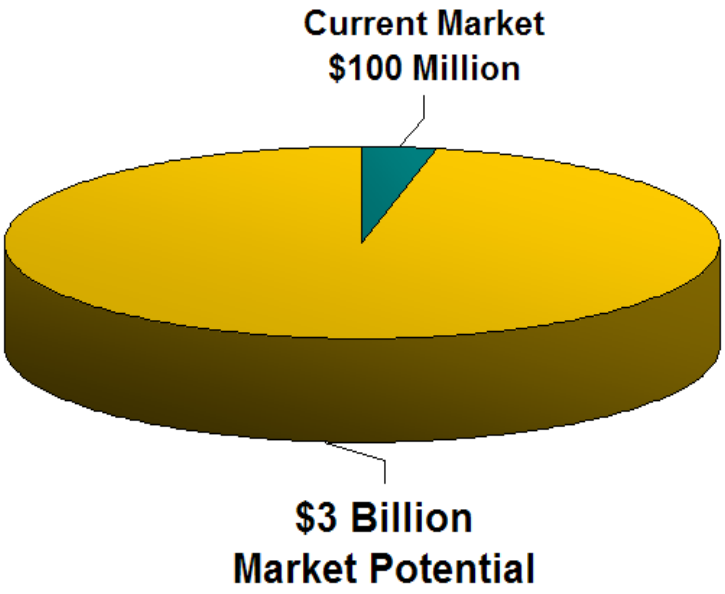
Steven Scandaliato is the Vice President of Business Development and a NICET IV certified Senior Engineering Technician at Telgian Corporation. He has over 26 years experience in fire protection design, project management, construction contracting and engineering, covering all types of fire suppression systems. Steven has also been involved in every facet of construction, project management and engineering system design. He serves as a member of the NFPA 13, 101, and 5000 Committees. He is published in several periodicals including articles for the NFPA Journal, Fire Marshals Quarterly and American Society of Plumbing Engineers. He is also a contributing author to the new text published by NFPA/SFPE titled “Designers Guide to Automatic Sprinkler Systems”. Over the last 12 years, he has presented seminars to thousands in contracting and professional associations including The American Fire Sprinkler Association, The American Society of Plumbing Engineers, The American Institute of Architects, The Society of Fire Protection Engineers and The International Fire Marshals Association. He is a member of NFPA and SFPE.

Ryan J. Smith is the President of Fire Smarts, LLC, a firm providing online educational and marketing services focused on fire protection. He has spent over 10 years in the fire protection and property insurance industries working to reduce the risk of fire related losses. Formerly, as Executive Vice President of Telgian Corporation, he facilitated the system development and internal operating procedures required to transform the company from a small business to a leading international firm. He is an MBA graduate of the W.P. Carey School of Business, holds the Facility Management Professional (FMP) designation from the International Facility Management Association and is a member of NFPA.

Executive Summary

The adoption by the International Code Council of amendment RB64-07/08 to the International Residential Code (IRC)[1] in Minneapolis, MN on September 21, 2008, mandates the installation of fire sprinklers in all one and two family residential dwellings and townhouses effective January 1, 2011. This action rapidly transforms the current single family residential fire sprinkler market estimated at $90.0 to $100.0 million annually[2] to a market that is worth an estimated **$2.9 billion** to **$3.2 billion** annually.[3] Although its impact will not be realized immediately, the next 2 to 5 years will bring the installation of residential fire sprinklers to near complete market saturation as jurisdictions adopt and enforce the 2009 edition of the IRC. This amendment will change the landscape of the fire sprinkler industry in a breadth and timeline never experienced before. Even using the depressed residential market that exists in 2008[4], the numbers are staggering and the opportunity ripe for those who are willing to take the challenge.

Single Family Residential Fire Sprinkler Market



This report attempts to quantify this once in a life-time opportunity. The authors admit that an effort to forecast the future can be frivolous especially in an industry dominated by cottage businesses (installing contractors) and as a result, comprehensive data is difficult to acquire. The upside is that there is a large body of information regarding residential construction available through the U.S. Census Bureau and the Department of Housing and Urban Development covering the last 40 years. Recognizing the limitations of data, the authors are conservatively biased in their assumptions, projections, and

[1] See Appendix Section 1

[2] Estimated that sprinklers were installed in 3% of single family homes completed in 2007 as reported by the U.S. Census Bureau and Department of Housing and Urban Development.

[3] See Appendix Section 2

[4] See Appendix Section 6.5

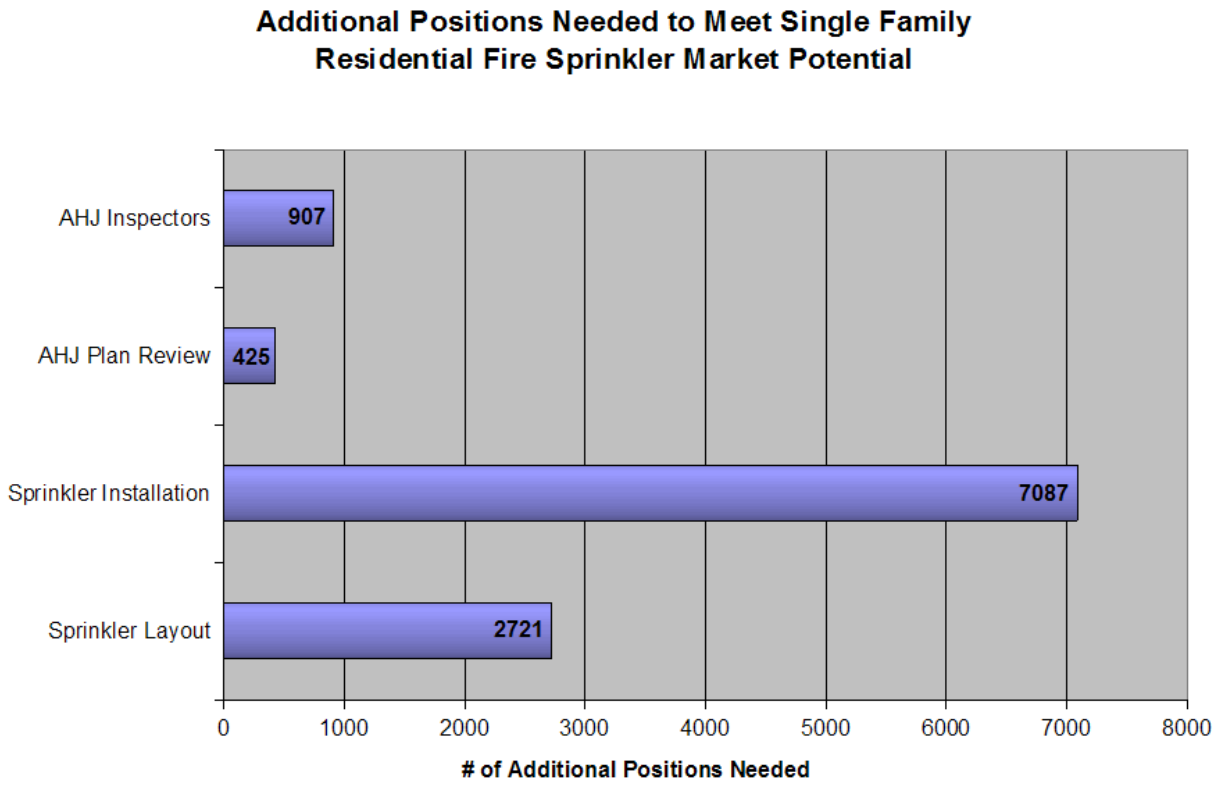
conclusions.

The application of residential fire sprinklers was sporadic in its development. The mandatory use of fire sprinklers in single family residential occupancies was slow to come about with a few notable exceptions. At this time, there are a relatively small number of jurisdictions in the United States requiring fire sprinkler protection for all single family homes and multifamily housing units. The most notable are San Clemente California, which adopted its ordinance in 1979, and Scottsdale Arizona in 1985. There are other jurisdictions that have adopted residential requirements in some form, but the number is small (around 400) when compared to the thousands of jurisdictions throughout the United States.

This is about to change in a significant way. The International Code Council, which publishes the International Residential Code, has been under increasing pressure to adopt a "zero" tolerance fire sprinkler requirement for all one and two family residences. The requirement was narrowly defeated during the last code cycle, but as a result of the approval of amendment RB64-07/08, will now be included in the 2009 edition.

This report examines the impact that mandatory residential fire sprinkler protection will have on the skilled labor needs of the industry. It is focused on illustrating the need for a concerted strategy by the engineering and construction communities to address the current lack of capacity for absorbing this work as it develops. The residential market is huge and the needs daunting, especially when viewed from the context that the fire sprinkler industry currently suffers from a shortage of qualified layout technicians, installers, and maintainers. In addition, an overlooked need is that for qualified AHJ plan review and inspection professionals. The numbers of positions needed to address each area is revealing. Research shows that (based on the 40 year average of completed single family dwellings) the residential fire sprinkler industry will require an additional 2700 layout technicians, 7100 installers, and over 1300 AHJ plan reviewers and inspectors to do the work. Fortunately, all 11,100 positions will not be needed at the outset but the industry must begin recruiting and training now to meet the demand as it develops.

"IRC residential fire sprinkler requirements will change the industry in a breadth and timeline never experienced before."



This projected shortage can be addressed, and this report is designed to give existing fire sprinkler contractors and those in related trades information to use in evaluating the return on investment (ROI) for developing the technical skills and associated technology needed to undertake this work. The potential rewards for those who invest early and systematically are unlike any experienced before in the industry.

History

Fire sprinkler technology traces its roots as early as 1723 when a patent was issued in England for an automatic water based suppression device that consisted of a wooden barrel filled with water to which powder charges were attached with a system of fuses running across the room or compartment.[5] The device was intended to operate when a fire lit a fuse, detonating the powder charge, rupturing the barrel and extinguishing the fire. It is not known if the device found an application, but the design basis is very much like that of the automatic systems of today.

The development of fire sprinkler systems evolved through a series of manual systems with perforated pipes and open nozzles. The first prototype automatic fire sprinkler was patented in 1874 by Henry S.

[5] *Automatic Sprinkler Systems Handbook* 2007 edition, Dubay, National Fire Protection Association p. xxvii

Parmelee and to this day the sprinkler has been the basis for the great majority of automatic fire suppression systems.

The market for automatic suppression systems was driven almost exclusively by the insurance industry for nearly 100 years. The application of fire sprinkler technology was utilized in high fire exposure industries and where the risk of business interruption from fire was high. Therefore, it was limited almost exclusively to commercial applications even as the model codes began to aggressively mandate the use of sprinklers for industrial applications along with warehousing, office, mercantile, and similar occupancies. The governing standard in the United States and Canada (outside of specific insurance standards) is NFPA 13 *The Standard for the Installation of Sprinkler Systems.* It was published in 1896 and was the first standard created by the organization that became the National Fire Protection Association. It has been revised some 50 times since the first edition, with the latest published in 2007.

The design criteria specified by NFPA 13 is centered on the protection of the building structure, and the application of fire sprinkler systems remained focused on the protection of property until the introduction of fast response sprinklers in the early 1980's. The first sprinkler system installation standard directed specifically towards life safety was titled NFPA 13D and published in 1975. It was rarely used until fast operating and low flow sprinklers were introduced in the early 1980's. The scope of NFPA 13D applies only to one and two family residences and manufactured housing. It provides a low cost alternative to the heavy protection requirements of NFPA 13 as the system is not designed to protect the structure, but to prevent flashover in a compartment for a sufficient length of time to allow the occupants to escape.

In addition, NFPA 13R was first published in 1989 with its scope limited to multi-family residential structures no more than four stories in height. The design criteria is expanded somewhat, but it is similarly focused on life safety for the occupants of the structure. NFPA 13R applications are widely used in today's fire sprinkler market as the codes have continued to expand the inclusion of fire sprinkler systems in multi-family occupancies.

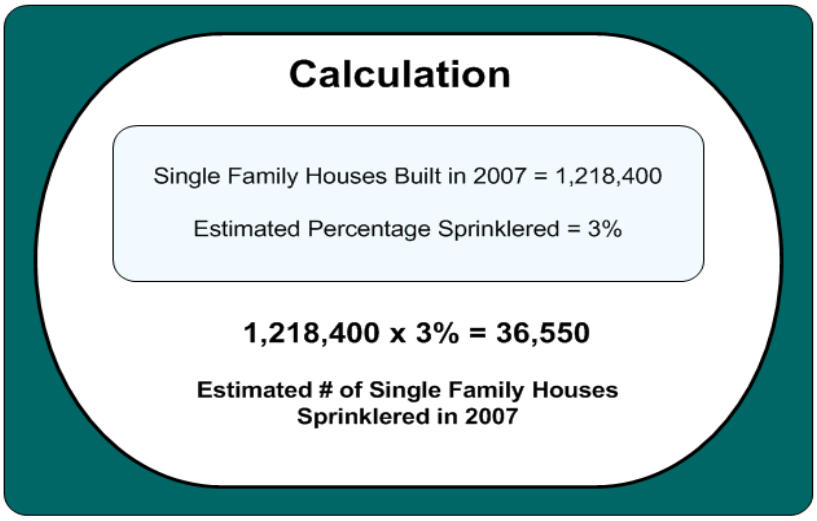
Market Analysis

Fire sprinkler manufacturers report that 47 million sprinklers were sold in the United States during 2007. Recent projections for 2008 forecast this number to decline to approximately 42 million. It can be assumed that virtually all sprinklers sold were installed. The installations include new construction, retrofits, and tenant improvements. Though hard financial data is difficult to find, by combining average construction costs across the United States for each type of work, it is estimated that the installation of fire sprinklers for all occupancies generated between 5 and 6 billion dollars of revenue, including the cost of the sprinklers, related materials and equipment, and labor.

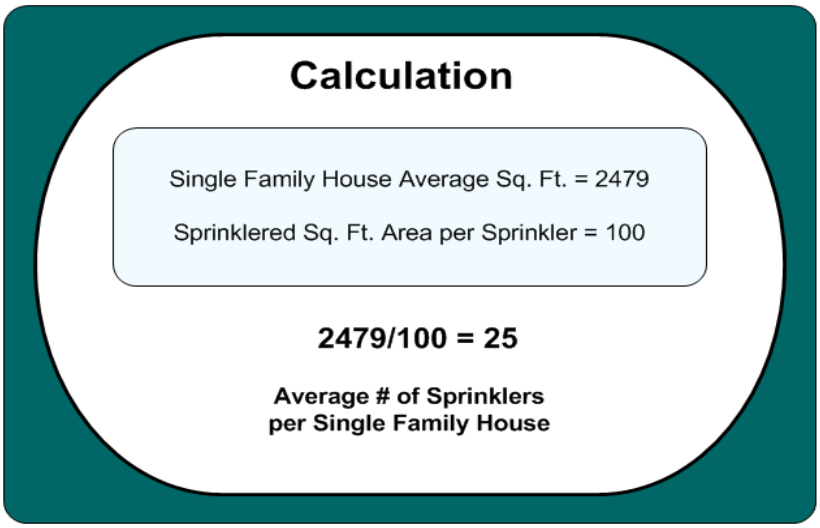
Segmenting out the residential sector of the fire sprinkler market is difficult. Much of the manufacturer information is understandably proprietary and the contractor community is principally cottage based

with little detailed historical data. The authors recognize that any evaluation of this nature is subject to question, but we believe that our conclusions are sound and biased to the conservative.[6]

It is estimated that no more than 3% of the new single family residential units completed in 2007 were equipped with fire sprinklers. HUD Statistics report that 1,218,400 single family residences were completed in 2007. Using the 3% factor, it is calculated that 36,550 of these residences were equipped with fire sprinklers.

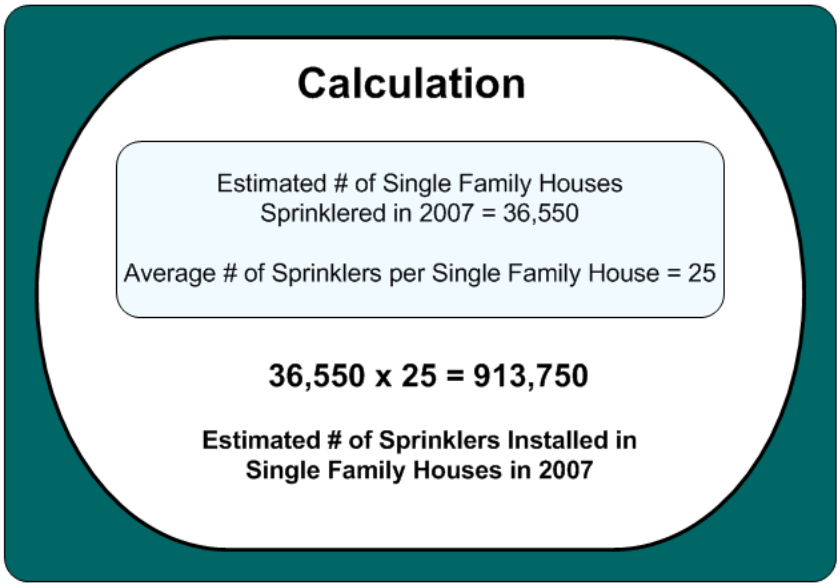


The U.S. Census Bureau and HUD also reported that the average single family house completed in 2007 was 2,479 ft² in size. Using a 100 ft² average for a sprinkler area of coverage it is estimated that the typical new house utilized 25 sprinklers.



[6] See Appendix Section 2

Using this data from 2007, the numbers indicate that 913,750 sprinklers were installed in single family residences against the potential for over 30,000,000 installed if fire sprinklers were installed in all completed units.



Market Value

Three different approaches were examined in calculating the current and potential market value.[7] These include unit cost per installed sprinkler, cost per square foot of sprinklered space, and percentage of contract value. The three methods show the following results:

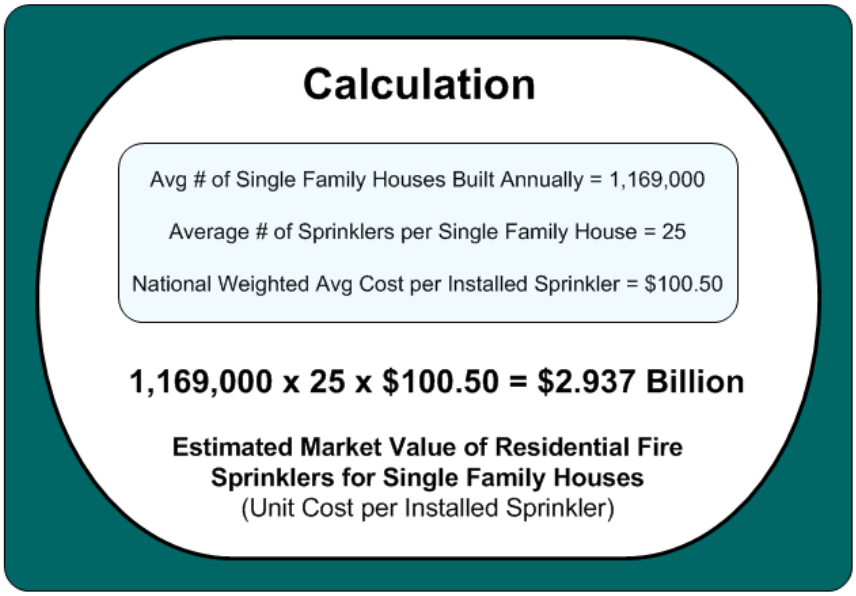
Unit Cost per Installed Sprinkler

In order to determine market value using this method a cost per installed sprinkler must be determined. When computing a cost by installed sprinkler, each unit weighted to carry a portion of the expenses not directly tied to the sprinkler itself such as the system valves, building water supply, flow indicators and alarms, feed pipe, support systems, and bracing. The system design, job site supervision, and company overhead are also factored into the unit cost. The system components (pipe, sprinklers, etc.), tools, and equipment costs are similar throughout the United States but design, installation labor, and overhead costs can vary greatly by geography.

[7] See Appendix Section 2

Using the regional costs per installed sprinkler, a national average cost of $100.50 per installed sprinkler has been determined.[8] Factors such as signatory or non-signatory labor, taxes, permit fees, and local jurisdictional or market conditions also have an impact on sprinkler system costs.

Using the unit cost method, for 2007, 913,750 sprinklers were installed in 36,550 single family homes with a market value of $91.832 million. Using the 40 year average of 1,169,000 single family units completed annually, the market potential is an impressive **$2.937 billion**.

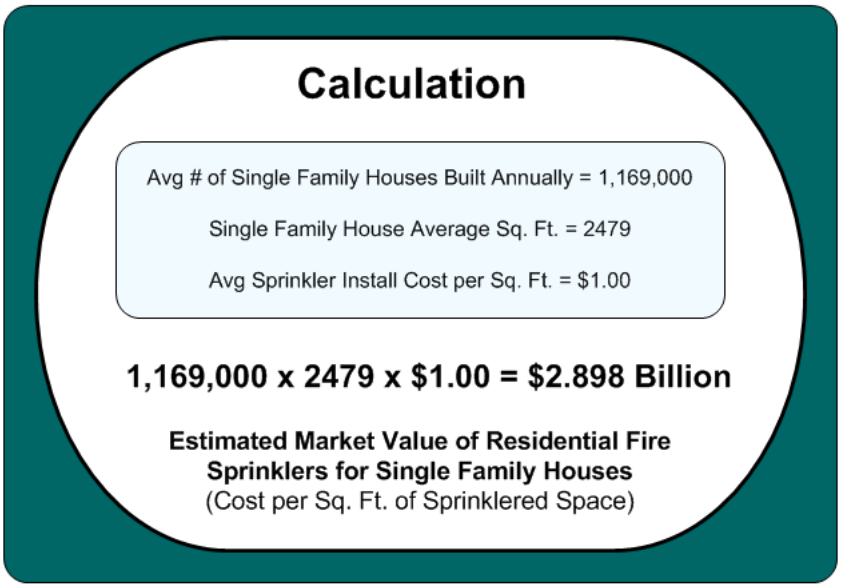


Cost per Square Foot of Sprinklered Space

Industry data is incomplete regarding sprinkler costs per square foot but research indicates that $1.00/ft² is a conservative average for single family units. These costs do not include impact fees, water meter surcharges, and other non-direct construction costs.

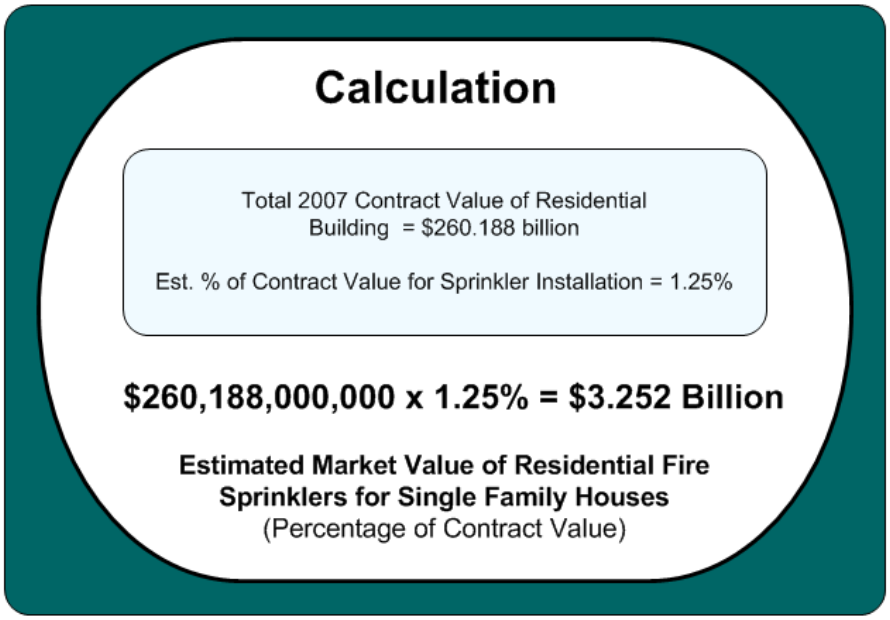
The cost per square foot calculation using the 40 year average number of single family houses built annually computes to a market potential of **$2.898 billion.**

[8] See Appendix Section 2.1



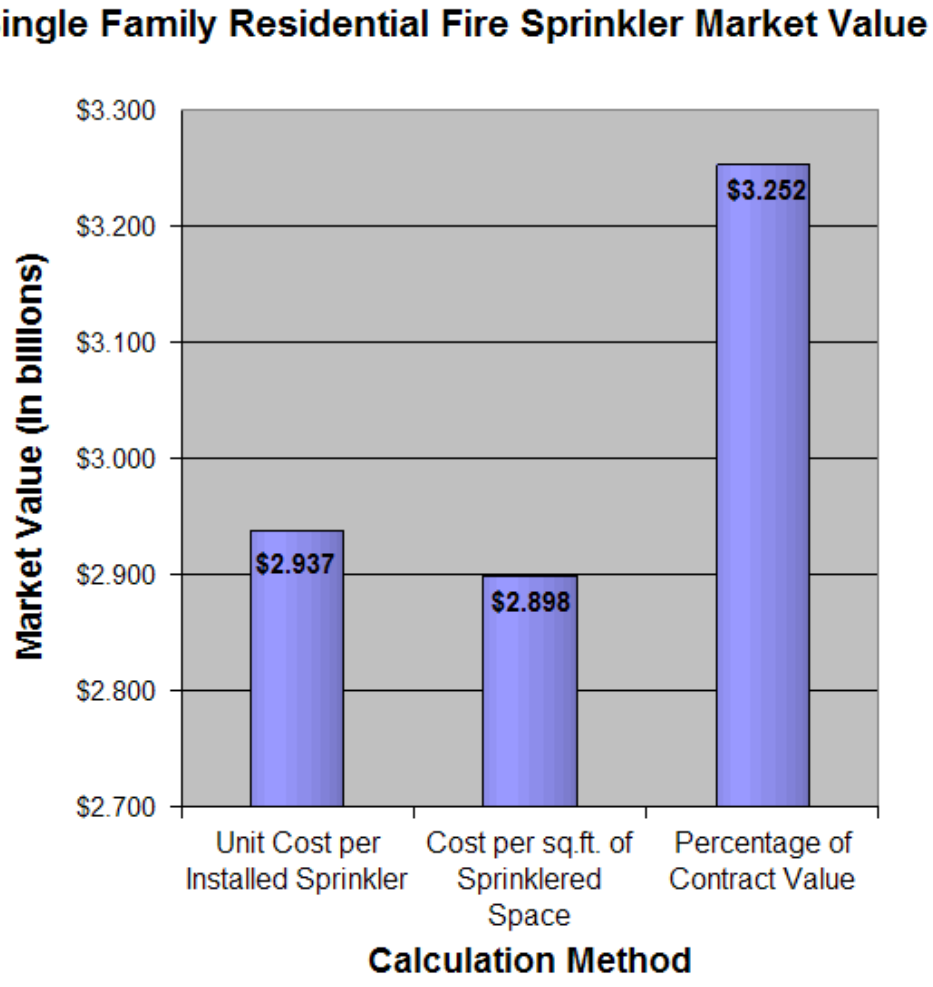
Percentage of Contract Value

Calculating a market value using a percentage of the construction contract value is the least reliable metric; however, it can provide a quick check for other methods. Industry data is again incomplete, but it is estimated that the installation of a sprinkler system adds approximately 1.25% to the construction contract value of a residential unit. F.W. Dodge Group reported that the total contract value of residential building in 2007 was $260.188 billion. Using a 1.25% factor against this total shows a potential residential fire sprinkler market value of **$3.252 billion**.



By whichever method the potential market is calculated, the impact of the mandatory installation of fire sprinklers is unlike any experienced heretofore by the industry. Even with the current depressed market conditions, the impact is significant. Using the data released by the U.S. Department of Commerce showing a 2008 projected completion number of 584,000 single family homes, the market value is between **$1.467 and $1.808 billion.**

To complete the picture, consider the recent peak year 2006 where 1,654,500 single family homes built would show results ranging from **$4.063 to $4.685 billion.**



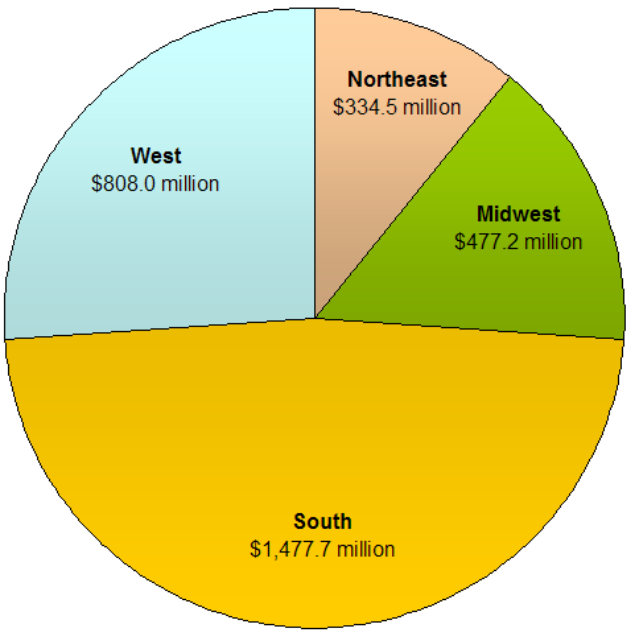
Regional Market Value

It is enlightening to examine the impact by region as identified by the U.S. Department of Commerce. The following potential market value by region for 2007 by unit cost per installed sprinkler shows the following:

	# of Single Family Homes Built in 2007	Average # of Sprinklers per Single Family Home	Unit Cost per Installed Sprinkler	Potential Residential Market Value
Northeast	104,600	26	$ 123.00	**$ 334.5 million**
Midwest	188,600	23	$ 110.00	**$ 477.2 million**
South	631,500	26	$ 90.00	**$ 1,477.7 million**
West	293,800	25	$ 110.00	**$ 808.0 million**
National	1,218,400	25	$ 100.50	**$ 3,061.2 million**

It is recognized that the economic metrics behind these estimates can be debated, but whatever analytics are used, the conclusions demonstrate that the impact is enormous.

Potential Residential Fire Sprinkler Market Value by Region



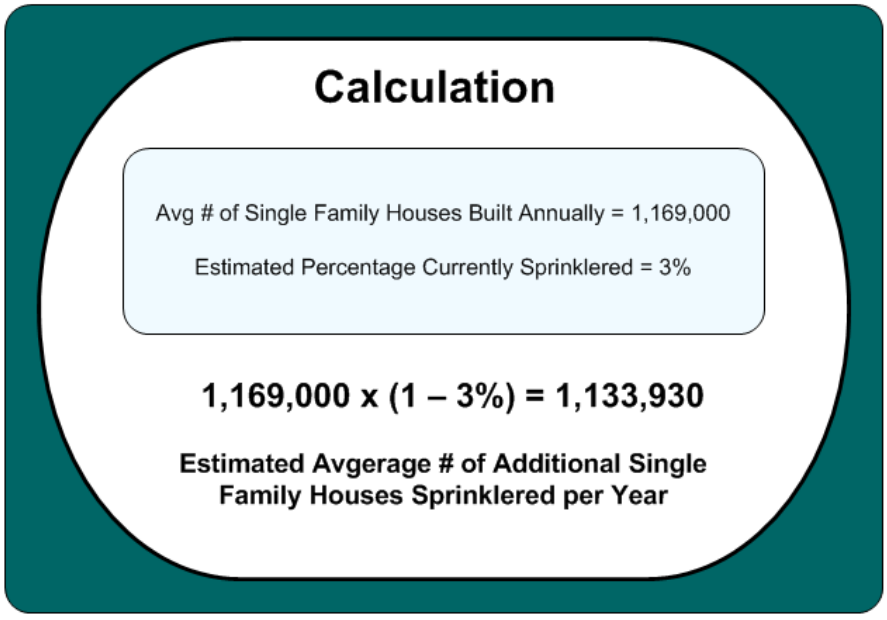
Labor Analysis

Fire sprinkler construction has three main components:

1) design
2) material procurement and fabrication
3) installation

The ability of the industry to absorb this infusion of new work will be greatly hindered by the lack of trained individuals in the design and installation components. The impact on material supply including fabrication is greatly mitigated by the fact that most systems will utilize plastic pipe and fittings.

The analysis of industry capacity is based on the 40 year residential construction average of 1,169,000 single family units built per year. Since it has already been assumed that 3% of single family units are currently being sprinklered, the following analysis is based on increased labor demands to accommodate an average of 1,133,930 additional single family units per year.



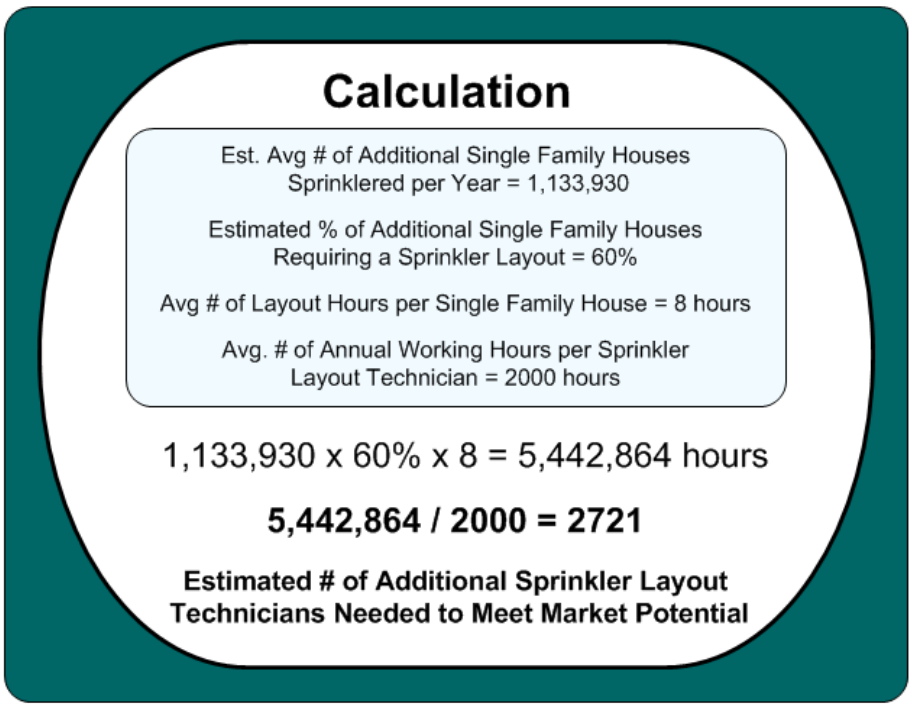
It is also expected that when the residential construction environment is strong the commercial building industry will experience at least average or above average activity.

Sprinkler Layout Labor

Residential fire sprinkler layout is not as complex as those for commercial applications, but it is a unique skill that requires an understanding of all sprinkler system design aspects such as design criteria, sprinkler use, and hydraulic analysis. All individual structures require a system layout with submission to

the approving authorities. There is some scale with tract developments and multi-unit developments with typical buildings. However, even with typical structures, hydraulic variations (such as differing pad elevations) often require non-typical system layouts with differing pipe sizes or system configurations.

Therefore, a conservative estimate is that 60 percent of the single unit structures will require system design and hydraulic analysis. It is also estimated that the average fire sprinkler layout technician can produce one complete single family dwelling system layout (including hydraulic analysis) in a standard work day (8 hours). Using these estimates, it is projected that 2,721 additional layout technicians will be required.[9]



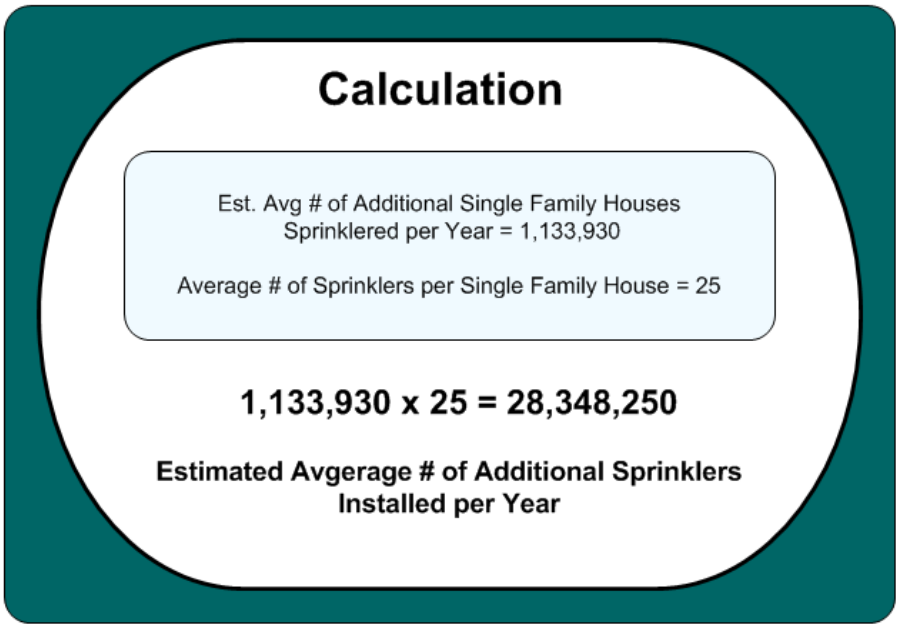
In an industry that is woefully understaffed with qualified technicians and with no sizeable investment in the recruiting and training of fire sprinkler layout technicians, the prognosis can be interpreted as bleak as to whether the industry can satisfy the needed supply of design capabilities.

Fortunately, the design of fire sprinkler systems for single family and smaller multi-unit structures even up to six or more units is simple when compared to larger commercial applications such as large condominium or apartment complexes. The training can be accomplished in fairly short order if focused and systematic. The challenge is that today's contractor is reticent to make even a modest investment in recruiting and training, and the industry is suffering the consequences of a short supply of qualified technicians. The influx of residential structures will greatly magnify this shortage.

[9] See Appendix Section 3

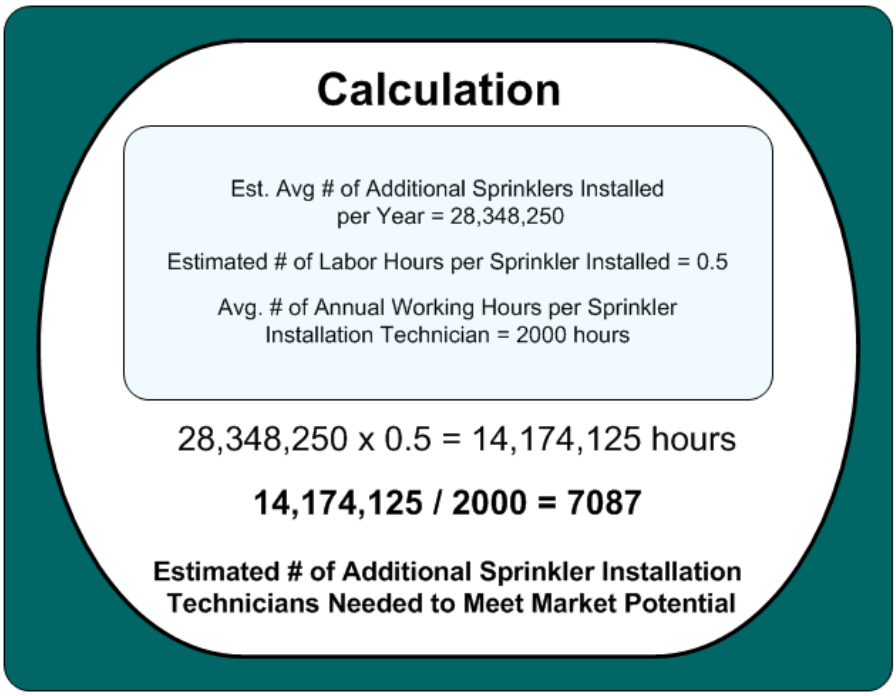
Sprinkler Installation Labor

The need for producing a sufficient supply of designers is mild compared to that of recruiting and training a qualified supply of installation labor. In 2007 it was estimated that 913,750 sprinklers were installed in single family units. Using the 40 year average of 1.169 million single family units built a year, there is a potential of 29.2 million sprinkler heads to be installed. This means that as residential fire sprinkler requirements are enforced approximately 28.3 million additional fire sprinklers will be installed annually.



A weighted average of 0.5 labor hours per sprinkler installed indicates that 7087 additional trained installation technicians will be required to handle this additional work.[10] This is about a one-third increase in the estimated number of technicians currently employed in the industry.

[10] See Appendix Section 4

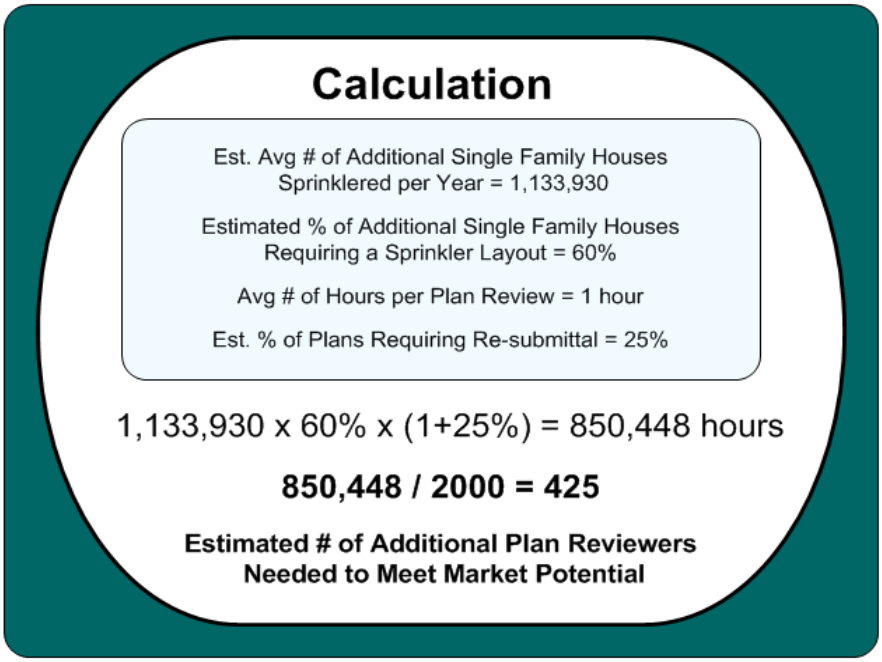


When the need for significant increases in the supply of trained design and installation labor is combined with the requirements for supervision, purchasing, administrative, and other supporting roles, it requires a serious examination of the challenges and opportunities that face the industry.

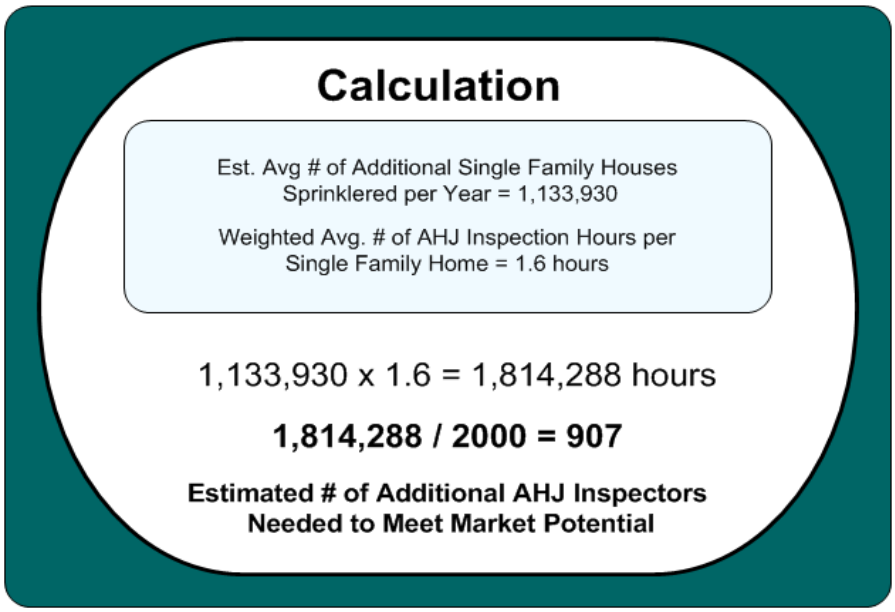
Jurisdictional Enforcement Labor

One area easily overlooked is the impact the adoption of zero-tolerance residential fire sprinkler requirements will have on the local authorities to properly police the design and installation of an additional 29 million sprinklers each year. Fire prevention bureaus in most professional departments throughout the United States are understaffed and undertrained for their current enforcement duties without taking on the immense workload created with the adoption of the residential fire sprinkler requirements by the ICC. Volunteer departments are another story in and of themselves, but suffice it to say that they are in no better position (and most likely less equipped) than the paid departments to handle the additional enforcement duties.

The additional work load is daunting. Even with some scale achieved from typical buildings used in tract developments and multi-unit developments, it is estimated that the working drawing(s) and hydraulic analysis review will be needed for an additional 680,358 residential systems annually. With an average of one hour for each plan review and a 25% factor for re-submittals a total of 850,448 hours will be needed for plan reviews, which is the equivalent of 425 additional full-time plan review positions.



In addition to the plan review, each single family residential unit will typically require two inspections of the fire sprinkler system to receive a certificate of occupancy. These inspections include an inspection and hydrostatic test of the piping and other components before being covered up by drywall and finish materials. The second is a final inspection and commissioning of the completed fire sprinkler system. It is estimated that each single family residence (1,133,930 additional units) will average 1.6 hours of inspection for a total of 1,814,288 hours, which is the equivalent of 907 full-time positions.[11]



[11] See Appendix Section 5

Recruiting and Training

There is no doubt that the adoption of this amendment will have a profound impact on the industry. How the industry responds is vital to the success of meeting the objectives desired by the proponents of fire sprinklers for all residential occupancies.

The accurate design and layout of fire sprinkler systems is more demanding than other building systems. Even though the requirements for detail where residential systems are involved are less onerous than commercial systems, the numerous factors involved require skill and knowledge. The accurate hydraulic analysis, the selection of the proper fire sprinkler(s), and their precise placement within design parameters such as position, location, areas of coverage, temperature rating, K-factor, and such is critical. Residential fire sprinkler system criteria are exact with little tolerance for field variance and good system installation starts with proper design.

There currently exists a shortage of qualified layout technicians. With the influx of new design work that is now projected, the industry faces the task of filling this need with trained and qualified technicians. The investment is substantial and will require the current contractors to put aside past neglect. There are a number of reasons for this neglect, and it is not the purpose of this report to address. However, it should be said that the contractor that attacks and solves this issue—wins.

If there has been neglect of design training, the neglect is even more pronounced when it comes to installation. Fire sprinkler system installation is much more than pipe and fittings. The proper location and position of each fire sprinkler is dependent on a variety of factors and tolerances are tight when compared to many building appliances. Recruiting and training to meet the coming demand is essential to the successful implementation of residential fire sprinkler requirements in the IRC. Finding 7000 new installation technicians will require creative and inventive tactics to fill these positions with qualified candidates. If the sprinkler industry stumbles in this regard, the opportunity is ripe for other piping trades, such as plumbing contractors, to step in and fill this demand.

“If the sprinkler industry stumbles in regard to training the opportunity is ripe for other piping trades to fill the demand.”

As with design and installation, another real concern is for the jurisdictions to develop the knowledge and expertise to provide competent enforcement. No small task when it is recognized that the fire prevention community has been historically understaffed and undertrained. A lack of qualified plan reviewers and inspectors will only magnify the risks and challenges that come with a shortage of trained

design and installation technicians. This vacuum may be best filled by a combination of fire service personnel and third-party sources, provided there is a sufficient protocol of checks and balances for the design and installation community.

Conclusion

With the passage of this amendment, the old adage comes to mind--"Be careful what you wish for because you might just get it." This amendment has the potential to create more work for the industry than any single event in the history of fire sprinklers. Of course, this potential will only be realized if the industry can prepare itself to perform this work in a qualified manner at a cost that justifies the investment. Those who step up to this opportunity have the chance to experience success at a level never contemplated by most. Sprinklers are a necessary part of the fire protection equation. Residential fire sprinklers are now part of the International Residential Code, and the challenge is now upon the industry to execute in the manner that the proponents envisioned.

Appendix

1. Item RB64-07/08

RB64–07/08

R313 (New), Appendix P, Chapter 43 (New)

Proponent: Ronny J. Coleman, Retired California State Fire Marshal, representing IRC Fire Sprinkler Coalition

1. Add new section as follows:

SECTION R313
FIRE SPRINKLER SYSTEMS

R313.1 General. Effective January 1, 2011, an approved automatic fire sprinkler system shall be installed in new one and two-family dwellings and townhouses in accordance with NFPA 13D.

(Renumber subsequent sections)

2. Delete IRC Appendix P without substitution:

~~**APPENDIX P**~~
~~**FIRE SPRINKLER SYSTEM**~~

~~*The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.*~~

~~**AP101 Fire sprinklers.** An approved automatic fire sprinkler system shall be installed in new one- and two-family dwellings and townhouses in accordance with Section 903.3.1 of the *International Building Code*.~~

3. Add standard to Chapter 43 as follows:

NFPA

3D-07 Installation of Sprinkler Systems in One- and Two-family Dwellings and Manufactured Homes

Reason: This proposal is submitted as part of a package of three proposals that were developed in cooperation with the International Association of Fire Chiefs with input from code officials, home builders, fire chiefs and other interested parties. During last year's code development cycle, many ICC members stated that the preferred way to advance fire sprinklers into new home construction is through a comprehensive approach that involves:

1. A schedule for implementation,
2. Reasonable and appropriate design and construction incentives, and
3. A simple, prescriptive methodology for designing systems.

In response, representatives of the IRC Fire Sprinkler Coalition (IRCFSC) and the International Association of Fire Chiefs have developed and submitted three proposals for this code cycle, one addressing each topic.

This proposal addresses the first issue, "a schedule for implementation." It requires new homes constructed after January 1, 2011 to have fire sprinklers. The delayed implementation date provides a time buffer that will allow for development of infrastructure, such as trained installers and inspectors, prior to the residential sprinkler requirement becoming effective. While the approach of delaying a code requirement may be unfamiliar to some, it is entirely appropriate, and it is already used by the IRC in Chapter 38, as follows:

E3802.12 Arc-fault protection of bedroom outlets. *All branch circuits that supply 120-volt, single-phase, 15- and 20-ampere outlets installed in bedrooms shall be protected by a combination type or branch/feeder type arc-fault circuit interrupter installed to provide protection of the entire branch circuit.* ***Effective January 1, 2008, such arc-fault circuit interrupter devices shall be combination type.*** *(emphasis added).*

It is common knowledge that fires in one- and two-family dwellings are the root of America's fire problem, and a substantial majority of ICC members who voted at last year's final action hearing, 56%, agreed that residential sprinklers are the right solution. To truly address America's fire problem, ICC members know that we must, at some point, begin to mainstream fire sprinklers into new home construction, and this proposal provides a rational way to make the transition by fixing a future date for the requirement to become effective.

During last year's debate, the IRCFSC provided detailed responses that addressed all of the concerns cited in testimony as a basis for opposing residential sprinklers. These concerns, which included the use of wells to supply sprinklers, freezing, leakage and cost, among others, were addressed in our public comment to proposal RB114-06/07 and in testimony offered at the final action hearing in Rochester. They were also addressed in a Web cast aired by the IRCFSC in May 2007, copies of which are now available on a free DVD that can be ordered at www.IRCFireSprinkler.org.

As a result of this outreach effort, opposition to sprinklers based on myths and misinformation has largely dissipated, and the debate has largely become focused on two issues; First, whether the requirement for fire sprinklers in dwellings should be determined at a local level, and second, whether the residential fire problem is limited to older homes. The remainder of this reason statement focuses on these two issues.

1. Should the requirement for fire sprinklers in dwellings be a local issue? Several speakers in Rochester who spoke in opposition to RB114 conveyed an opinion that requirements for fire sprinklers in dwellings should be decided at the local level. The question is why? By including Appendix P, the IRC has already acknowledged fire sprinklers as a basic safety feature that should be included in new homes. There is no premise for the IRC to promote residential fire safety on community-by-community basis. The IRC, as a model code, should promote safety and regulatory consistency among all jurisdictions, as opposed to creating a local "shopping list" of safety requirements.

No other ICC code treats sprinkler requirements or residential fire safety as a local choice to be made at the time of code adoption. The IBC establishes a baseline that ALL residential occupancies must be protected by fire sprinklers, including one- and two-family dwellings and townhouses. Some argue that it's appropriate for IBC to be more restrictive than the IRC because use of the IBC is only mandatory for dwellings exceeding three stories in height, but that argument disregards one very important fact; most residential fire deaths occur in one- and two-story homes. To have an impact on fire deaths in one- and two-story homes, we need a fire sprinkler requirement in the IRC.

A newly published study by the National Institute of Standards and Technology (NIST) entitled "Benefit-Cost Analysis of Residential Fire Sprinkler Systems," reports that, out of almost 2,000 fire incidents in homes equipped with fire sprinklers during the 4-year period 2002 to 2005, there were no fire-related fatalities. This statistic clearly demonstrates the potential for sprinklers to save thousands of lives that would otherwise be lost in residential fires. With the knowledge that residential fire sprinklers are a proven, life-saving technology, it is clear that the IRC should establish a model that sprinklers are a minimum safety feature that should be included in all new homes.

2. Is the residential fire problem limited to older homes?
According to a recent HUD study, the median age of homes in the U.S. is 32 years. With this in mind, it makes perfect sense that more fires and fire deaths occur in "older" homes, simply because there are many more of them. However, the residential fire problem is certainly not limited to older homes, and it is has not been correlated with home age.

To evaluate the relationship between the age of a home and fire risk, it is necessary break the concept of fire risk into its two components, the probability of a fire event occurring and the associated consequence once the event occurs. The probability of a fire event occurring equates to the risk of fire ignition. With respect to the age of a home, only those ignition sources that are permanently affixed to a home, such as central heating systems or electrical distribution systems, might be directly correlated to home age, but to date, there are no known studies demonstrating increased fire risk as these systems age. Such a study would be difficult to perform because heating and electrical systems are often replaced when a home is remodeled, breaking any correlation that might otherwise exist between the age of a home and the age of fixed systems installed therein. Nevertheless, because most fire deaths are associated with ignition scenarios related to human behavior, which are independent of home age, it is clear that home age has little to do with the probability of a fire event.

With respect to consequences associated with a fire event, assuming that an ignition has occurred, it is again difficult to establish any correlation with home age, except to the extent that the probability of safe evacuation is increased based on the possible presence of working smoke alarms and/or escape windows. On the contrary, some design and construction methods commonly used in new homes actually reduce fire safety. These include the use of lightweight trusses (now used in more than 60% of new homes according to the Wood Truss Council of America), which are known to become unstable and collapse more quickly in fire situations than conventional construction; and open floor plans, which reduce compartmentation and allow a fire to quickly spread throughout a home.

The truth is that fire growth in a home is largely dependent on contents, not the structure itself, and contents are independent of home age. Although smoke alarms and escape windows associated with newer homes are beneficial in some fire incidents, statistics show that the value of these features is declining over time, as fire deaths in homes that have working smoke alarms are becoming increasingly common. The most recent data (for the period 2000 to 2004), shows that 34% of fire deaths occurred in homes that had WORKING smoke alarms. This is up from 24% in the previous period, and as smoke alarms age, we can only assume that their reliability will continue to decline unless they are periodically replaced, which seems to be wishful thinking when one considers that we have a problem even getting people to change batteries in smoke alarms on a regular basis.

In summary, a simple risk analysis demonstrates that home age is largely independent of either the risk of ignition or the consequences of a fire, if ignition occurs. Therefore, it is clear that home age has little to do with the residential fire problem or the need for residential sprinklers.

Conclusion:
The outpouring of support for residential sprinklers has been building for many years, and today, all U.S. model building codes require fire sprinklers in residential occupancies, including one- and two-family dwellings, with the exception of the IRC. It is only logical that the IRC should finally acknowledge the value of residential sprinklers in preventing deaths, injuries and property loss by making sprinklers a standard feature in new home construction.

Although some in the IRC arena have argued that "big government" shouldn't intrude into American homes by requiring fire sprinklers, those of us who have been around for a while will recall that this same argument was made 30-years ago when smoke alarms were first required in dwellings. Today, it's hard to imagine any reasonable individual arguing that the IRC requirement for smoke alarms constitutes a "government intrusion" into the American home, largely because smoke alarms are viewed as cost-effective safety devices. Sprinklers should be viewed the same way.

Given the proposed incentive package and prescriptive design option for multipurpose fire sprinkler systems being advanced this year in a proposal by the International Association of Fire Chiefs, it is entirely feasible that it will be cheaper to build some homes with fire sprinklers than without. For those cases where there is a net cost to sprinklers, NIST's newly published "Benefit-Cost Analysis of Residential Fire Sprinkler Systems" report concludes that multipurpose residential fire sprinkler systems are still a good investment, yielding a positive present value of net benefits (PVNB) for every home type studied, including ranch-style homes, colonial-style homes and townhouses.

This proposal provides a reasonable and justified approach for advancing fire sprinklers into the body of the IRC, and the time has come to for the IRC to include fire sprinklers as part of the model for residential construction.

ABOUT THE IRC FIRE SPRINKLER COALITION: The IRC Fire Sprinkler Coalition is an organization that represents national, state and regional groups of code officials and other associations focused on public safety. The Coalition has been active in presenting training programs to code officials and others aimed at conveying facts and debunking myths and misinformation about residential sprinklers. At the time of submittal of this proposal, groups who pledged to support the IRC Fire Sprinkler Coalition's mission of mainstreaming fire sprinklers into new home construction included:

NATIONAL AND REGIONAL COALITION MEMBERS
* International Association of Fire Chiefs – Fire and Life Safety Section
* Center for Campus Fire Safety
* ICC Joint Fire Service Review Committee
* Institution of Fire Engineers, US Branch
* International Fire Marshals Association
* National Association of State Fire Marshals
* New England Association of Fire Marshals
* New England Division of the International Association of Fire Chiefs
* Safe Buildings Coordinating Committee
* Society of Fire Protection Engineers
* Southeastern Association of Fire Chiefs
* Uniform Fire Code Association
* Western Fire Chiefs Association

STATE AND LOCAL COALITION MEMBERS

Alaska
* Alaska Fire Chiefs Association

Arizona
* Arizona Fire Chiefs Association
* Arizona Fire Marshals Association
* Arizona: Society of Fire Protection Engineers, Arizona Chapter
* Arizona: Yuma County, AZ Fire Officer's Association

California
* California: California Fire Chiefs Association
* California: Northern California Fire Prevention Officers Section
* California: Orange County Fire Chiefs Association
* California: Southern California Fire Prevention Officers Section

Colorado
* Colorado: Fire Marshals Association of Colorado

Connecticut
* Connecticut: Capitol Region Fire Marshals Association of Connecticut

Delaware
* Delaware: Fire Marshals Association of Delaware Valley

Florida
* Florida Fire Marshals and Inspectors Association

* Florida Fire Chiefs Association
* Florida: Northeast Florida Fire Prevention Association

Idaho
* Idaho Fire Chiefs Association
* Idaho Fire Prevention Officers Association

Illinois
* Illinois Fire Inspectors Association
* Illinois Fire Chiefs Association
* Illinois: Lake County Fire Chiefs Association

Indiana:
* Indiana: Fire Inspectors Association Of Indiana

Iowa
* Iowa: Hawkeye State Fire Safety Association, Iowa
* Iowa Fire Marshal's Association

Louisiana
* Louisiana Association of Fire Prevention Chiefs

Maryland
* Maryland Building Officials Association
* Maryland State Firemen's Association

Maine
* Maine Fire Chiefs Association

Massachusetts
* Massachusetts: Fire Chiefs Association of Massachusetts

Michigan
* Michigan Association of Fire Chiefs
* Michigan Fire Inspectors Society
* Michigan: Macomb County Fire Chiefs Association

Missouri
* Missouri: Tri-Lakes Fire Chiefs Association

Minnesota
* Minnesota: Fire Marshals Association of Minnesota

Nebraska
* Nebraska Municipal Fire Chiefs Association

Nevada
* Nevada: Fire Prevention Association of Nevada

New Jersey
* New Jersey Fire Prevention and Protection Association
* New Jersey: Northern Ocean Fire Chiefs Association
* New Jersey: Uniform Fire Prevention/Protection Officials Assn. of Ocean County

New Mexico
* New Mexico Fire Marshals Association

New York
* New York: Association of Fire Districts of the State of New York
* New York: Career Fire Chiefs' Association of New York State
* New York: Fire Marshals Association of Suffolk County
* New York: Firemen's Association of the State of New York
* New York: Monroe County, NY Fire Marshals & Inspectors Association
* New York State Association of Fire Chiefs
* New York State Building Officials Conference
* New York State Code Coalition to Protect and Preserve our Communities:
* New York State Fire Marshals and Inspectors Association
* New York: Suffolk County Fire Chiefs Association

North Carolina
* North Carolina State Firemen's Association

Ohio
* Ohio Fire Officials Association

Oregon
* Oregon Fire Code Committee
* Oregon Fire Marshals Association

Pennsylvania
* Pennsylvania Fire and Emergency Services Institute

Rhode Island
* Rhode Island Association of Fire Marshals

Tennessee
* Tennessee Fire Safety Inspectors Association

Texas
* Texas Fire Marshals Association
* Texas: Fire Prevention Association of North Texas

Virginia
* Virginia: Central Virginia Fire and Arson Association
* Virginia Fire Chiefs Association
* Virginia Fire Prevention Association

Washington
* Washington Fire Chiefs Association
* Washington State Assn of Fire Marshals

Cost Impact: This code change will increase the cost of construction.

Analysis: This proposal includes an "effective date" which is typically not included in the I-Codes. Typically, the provisions in the code become effective when the code is adopted.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

2. Estimating Market Value

Several approaches were used to estimate the current and potential market value for installing fire sprinklers in all U.S. single family residential units. Fire sprinkler industry financial data is hard to assemble, but it is believed that the conclusions reached are realistic and biased towards the conservative. These calculations are detailed in 2.1 through 2.3. The method used in the report utilized a unit cost per installed sprinkler. This was chosen as it lends itself to the purpose of illustrating the impact of the code change on the market with the emphasis on skilled labor. Two other approaches include examining values by square footage constructed and total construction contract values.

2.1. Value by unit cost per installed sprinkler

Many in the industry use unit costs to determine contract value. Using industry knowledge and polling contractors throughout the United States the following regional and national costs were developed for this report:

	Unit Cost per Installed Sprinkler	# of Single Family Homes Built in 2007
Northeast	$ 123.00	104,600
Midwest	$ 110.00	188,600
South	$ 90.00	631,500
West	$ 110.00	293,800

National Weighted Average
Unit Cost per Installed Sprinkler = $ 100.50

To use a unit cost approach an average number of sprinklers per dwelling unit must be determined. The approach taken by the authors incorporates an evaluation of the maximum area of coverage for residential fire sprinklers, the average square footage of dwelling units, the typical areas not covered by sprinklers such as attached garages, small bathrooms and closets, and architectural features that affect the placement of sprinklers. There is much subjectivity involved but the authors emphasize that the objective of the analysis is to lay a foundation for the conclusions regarding the economic impact, not to provide exact numbers of sprinklers.

Using this approach, the authors have concluded that a conservative average of 100 ft^2 is acceptable. Using this area of coverage, the average square footage was taken by region for 2007 and the following sprinkler counts were identified:

	Average Sq. Ft. per Single Family Home	Average # of Sprinklers per Single Family Home
Northeast	2,582	26
Midwest	2,257	23
South	2,538	26
West	2,456	25

National Weighted Average
Average # of Sprinklers per Single Family Home = 25

2.2. Value by cost per square foot of sprinklered space

The U.S. Census Bureau and the Department of Housing and Urban Development reported that the average square footage of single family residences completed in 2007 was 2479 ft². The average size of single family houses has steadily increased since 1978 when it stood at 1750 ft². The average grew to 2265 ft² in 2001 and 2642 ft² for the 2nd quarter of 2008.

3. System Layout Labor Analysis

Estimating the number of design hours needed to meet the potential market can be evaluated several different ways. The process is simplest for the single family market. Each individual home requires a complete system consisting of a water supply, system riser with control valve(s) and appurtenances, piping network, and sprinklers. The working plans for the system must show all of these components and hydraulic calculations must be prepared to demonstrate that the system will deliver the specified design criteria.

It is estimated that the completion of working drawings and hydraulic calculations will average 8 hours for a single family dwelling unit. More complex and larger homes will take longer, while simple small ramblers will require something less than 8 hours. Since a number of homes will have typical floor plans in tract developments, it is conservatively estimated that only 60% of single family residences will require complete and customized working drawings. It should also be noted that even where typical floor plans are found, the hydraulic characteristics can vary due to variables in water supplies (pressure

variances are the most common due to elevation changes, underground piping configurations, meters, and such).

Taking these variables into consideration, the following calculation is made:

60% of the 1,133,930 dwellings units will require working drawings and hydraulic calculations. Each of these 680,358 designs will average 8 hours of labor by a qualified system layout technician which totals 5,442,864 hours. With the average layout technician working an average of 2000 hours annually, a total of 2,721 trained layout technicians are needed to meet the demand.

4. Installation Labor Analysis

Installation labor is typically quantified by contractors using the number of labor hours needed to install one sprinkler. For the purposes of this report, all the labor involved with installing a sprinkler system is factored with and measured in terms of time per installed sprinkler. This includes the time to prepare and install the piping, supports, bracing, sprinklers, valves, alarms, and all appurtenances. Also, included is time for job site supervision, job site coordination, and all required commissioning and acceptance tests.

The type of piping, fittings, and sprinklers will affect the time it takes to install a sprinkler. Plastic pipe and fittings (CPVC) will require less time than using threaded steel pipe. Because of the wide use of plastic pipe (over copper or steel), the labor factor selected for this report is based on the use of plastic pipe and fittings. Using the experience of the authors, polling a number of sprinklers contractors including both union and merit, and giving consideration to regional differences, a labor factor of 0.5 hours per sprinkler was decided upon.

Using the 40 year average for completed single family homes with an average of 25 sprinklers for each dwelling, the total number of sprinklers installed annually is 29,225,000. Using the ratio of 0.5 labor hours for each sprinkler, the total number of labor hours required is 14,174,125. Taking a standard number of hours worked in a year at 2000 calculates to 7087 full-time installation technicians.

5. Jurisdictional Enforcement Labor Analysis

System acceptance typically consists of two site visits. The first involves a hydrostatic test of the piping to verify that it will hold pressure and has no leaks. This is done with the piping exposed and the inspector typically examines the piping supports for proper installation in addition to the pipe and fittings. The second visit comes at the completion of the building and consists of an inspection of the finished installation and an operational test of the system.

Unlike plan review in which one plan can represent typical units (such as tract home developments), each individual unit must be inspected. However, it is recognized that with tract developments,

inspections can often be performed for a number of units in a single visit. Therefore, for the purposes of this report the number of hours needed to complete each inspection is set at one hour for non-tract homes (680,358 units) and one-half hour for units in tract developments (453,572 units). These time estimates are considered conservative and include consideration for travel, re-inspections, and paperwork.

6. U.S. Department of Housing and Urban Development Data

6.1. New Privately Owned Housing Units Completed

New Privately Owned Housing Units Completed

Annual Data

(Components may not add to total because of rounding. Number of housing units in thousands.)

Year	Total	In structures with--			Region							
		1 unit	2 to 4 units	5 units or more	Northeast		Midwest		South		West	
					Total	1 unit	Total	1 unit	Total	1 unit	Total	1 unit
1968	1,319.8	858.6	77.4	383.6	198.8	(NA)	347.5	(NA)	527.4	(NA)	246.1	(NA)
1969	1,399.0	807.5	79.8	512.1	219.8	(NA)	344.7	(NA)	553.1	(NA)	281.4	(NA)
1970	1,418.4	801.8	85.1	531.5	184.9	(NA)	323.4	(NA)	594.6	(NA)	315.5	(NA)
1971	1,706.1	1,014.0	106.1	586.1	225.8	(NA)	348.1	(NA)	727.0	(NA)	405.2	(NA)
1972	2,003.9	1,160.2	119.2	724.7	281.1	(NA)	411.8	(NA)	848.5	(NA)	462.4	(NA)
1973	2,100.5	1,197.2	123.5	779.8	294.0	(NA)	441.7	(NA)	906.3	(NA)	458.6	(NA)
1974	1,728.5	940.3	95.3	692.9	231.7	(NA)	377.4	(NA)	755.8	(NA)	363.6	(NA)
1975	1,317.2	874.8	60.4	381.8	185.8	(NA)	313.2	(NA)	531.3	(NA)	286.8	(NA)
1976	1,377.2	1,034.2	77.1	265.8	170.2	(NA)	355.6	(NA)	513.2	(NA)	338.3	(NA)
1977	1,657.1	1,258.4	94.9	303.7	176.8	(NA)	400.0	(NA)	636.1	(NA)	444.2	(NA)
1978	1,867.5	1,369.0	116.1	382.2	181.9	(NA)	416.5	(NA)	752.0	(NA)	517.1	(NA)
1979	1,870.8	1,301.0	124.9	444.9	188.4	135.2	414.7	293.8	761.7	534.9	506.0	337.1
1980	1,501.6	956.7	118.8	426.3	146.0	99.8	273.5	169.6	696.1	454.6	386.0	232.8
1981	1,265.7	818.5	111.4	335.7	127.3	86.9	217.7	139.8	626.4	408.4	294.3	183.3
1982	1,005.5	631.5	80.7	293.1	120.5	79.0	143.0	92.2	538.8	339.5	203.2	120.7
1983	1,390.3	923.7	92.0	374.4	138.9	106.1	200.8	141.6	746.0	475.9	304.6	200.2
1984	1,652.2	1,025.1	112.2	514.8	168.2	128.6	221.1	155.8	866.6	508.2	396.4	232.5
1985	1,703.3	1,072.5	97.2	533.6	213.8	167.8	230.5	151.3	812.2	514.0	446.8	239.4
1986	1,756.4	1,120.2	86.1	550.1	254.0	193.1	269.8	170.0	763.8	504.5	468.8	252.6
1987	1,668.8	1,122.8	71.4	474.6	257.4	195.8	302.3	201.3	660.4	467.2	448.7	258.5
1988	1,529.8	1,084.6	56.6	388.6	250.2	187.7	280.3	191.3	594.8	457.0	404.6	248.4
1989	1,422.8	1,026.3	58.7	337.9	218.8	159.0	267.1	190.7	549.4	420.0	387.5	256.6
1990	1,308.0	966.0	44.8	297.3	157.7	126.7	263.3	195.0	510.7	389.3	376.3	254.9
1991	1,090.8	837.6	36.8	216.6	120.1	99.6	240.4	185.3	438.9	348.2	291.3	204.5
1992	1,157.5	963.6	36.1	158.0	136.4	113.7	268.4	218.2	462.4	399.6	290.3	232.2
1993	1,192.7	1,039.4	26.3	127.1	117.6	105.2	273.3	231.6	512.0	455.7	290.0	246.9
1994	1,346.9	1,160.3	31.8	154.9	123.4	112.9	307.1	255.0	580.9	507.3	335.5	285.1
1995	1,312.6	1,065.5	34.7	212.4	126.9	107.8	287.9	232.1	581.1	472.4	316.7	253.2
1996	1,412.9	1,128.5	33.1	251.3	125.1	107.8	304.5	244.5	637.1	507.3	346.2	268.8
1997	1,400.5	1,116.4	37.0	247.1	134.0	115.5	295.9	236.4	634.1	505.6	336.4	258.9
1998	1,474.2	1,159.7	40.6	273.9	137.3	116.4	305.1	243.5	671.6	517.2	360.2	282.5
1999	1,604.9	1,270.4	35.2	299.3	142.7	114.7	334.7	276.2	732.7	569.7	394.8	309.9
2000	1,573.7	1,241.8	27.3	304.7	146.1	120.4	334.4	268.9	729.3	565.9	363.9	286.5
2001	1,570.8	1,255.9	33.9	281.0	144.8	113.7	316.4	261.1	726.3	578.2	383.3	302.9
2002	1,648.4	1,325.1	35.0	288.2	147.9	113.3	329.8	272.0	757.8	614.8	412.8	325.0
2003	1,678.7	1,386.3	31.5	260.8	154.6	113.6	332.2	274.2	755.6	635.5	436.2	363.1
2004	1,841.9	1,531.5	23.5	286.9	155.9	118.9	362.4	303.6	840.4	699.8	483.3	409.2
2005	1,931.4	1,635.9	37.5	258.0	170.7	131.7	351.9	307.2	903.7	760.5	505.1	436.5
2006	1,979.4	1,654.5	40.8	284.2	179.1	128.3	325.1	285.5	986.7	825.8	488.6	414.9
2007	1,502.8	1,218.4	31.4	253.0	144.8	104.6	222.7	188.6	766.1	631.5	369.3	293.8

NA Not available.

Note: Single-family estimates prior to 1999 include an upward adjustment of 3.3 percent made to account for structures completed in permit-issuing areas without permit authorization.

6.2. Median and Average Square Feet of Floor Area in New One-Family Houses Sold by Location

Median and Average Square Feet of Floor Area in New One-Family Houses Sold by Location

(Medians and averages computed from unrounded figures)

	Median square feet							Average square feet						
				Region							Region			
Year	United States	Inside MSAs	Outside MSAs	North-east	Midwest	South	West	United States	Inside MSAs	Outside MSAs	North-east	Midwest	South	West
1978	1,650	1,710	1,420	1,730	1,590	1,700	1,600	1,750	1,810	1,510	1,800	1,700	1,800	1,700
1979	1,650	1,710	1,390	1,770	1,600	1,670	1,600	1,760	1,820	1,480	1,830	1,710	1,790	1,700
1980	1,570	1,630	1,330	1,670	1,470	1,600	1,510	1,700	1,760	1,410	1,810	1,640	1,730	1,640
1981	1,560	1,650	1,270	1,800	1,390	1,570	1,540	1,710	1,790	1,390	1,880	1,640	1,730	1,660
1982	1,530	1,570	1,290	1,720	1,440	1,520	1,530	1,690	1,730	1,440	1,830	1,670	1,690	1,640
1983	1,580	1,610	1,390	1,670	1,680	1,580	1,530	1,740	1,770	1,470	1,820	1,880	1,740	1,630
1984	1,610	1,640	1,380	1,670	1,690	1,590	1,570	1,790	1,830	1,470	1,910	1,900	1,760	1,720
1985	1,590	1,620	1,330	1,640	1,610	1,590	1,580	1,760	1,790	1,480	1,830	1,780	1,750	1,710
1986	1,650	1,680	1,370	1,760	1,640	1,660	1,600	1,810	1,840	1,490	1,890	1,810	1,820	1,740
1987	1,760	1,780	1,510	1,810	1,720	1,780	1,730	1,900	1,920	1,630	1,920	1,880	1,930	1,850
1988	1,800	1,820	1,500	1,730	1,760	1,800	1,820	1,960	1,990	1,670	1,950	1,910	1,990	1,960
1989	1,860	1,900	1,440	1,840	1,820	1,830	1,900	2,000	2,050	1,600	1,990	1,960	2,010	2,020
1990	1,890	1,940	1,460	1,910	1,820	1,890	1,910	2,050	2,100	1,650	2,080	1,960	2,070	2,060
1991	1,900	1,960	1,450	2,000	1,810	1,890	1,940	2,050	2,100	1,600	2,110	1,960	2,060	2,080
1992	1,900	1,940	1,520	2,000	1,800	1,950	1,830	2,060	2,100	1,670	2,100	1,970	2,120	2,000
1993	1,900	1,950	1,550	2,000	1,800	2,000	1,810	2,060	2,100	1,670	2,120	1,960	2,140	1,990
1994	1,900	1,940	1,530	2,020	1,800	1,970	1,810	2,050	2,090	1,660	2,210	1,950	2,110	1,960
1995	1,880	1,940	1,570	2,080	1,800	1,980	1,790	2,050	2,090	1,650	2,190	1,940	2,130	1,950
1996	1,940	1,970	1,620	2,100	1,830	1,990	1,860	2,090	2,120	1,740	2,290	1,970	2,140	2,020
1997	1,960	2,000	1,620	2,120	1,890	2,000	1,900	2,140	2,170	1,760	2,280	2,050	2,170	2,090
1998	2,000	2,040	1,610	2,130	1,930	2,020	1,950	2,170	2,210	1,750	2,310	2,070	2,210	2,120
1999	2,033	2,082	1,667	2,204	1,935	2,087	1,977	2,221	2,263	1,806	2,340	2,097	2,278	2,178
2000	2,077	2,127	1,729	2,323	1,982	2,092	2,042	2,265	2,308	1,846	2,469	2,148	2,287	2,245
2001	2,099	2,136	1,794	2,301	1,936	2,137	2,062	2,282	2,321	1,925	2,486	2,144	2,309	2,272
2002	2,134	2,171	1,805	2,323	1,946	2,158	2,166	2,301	2,344	1,923	2,487	2,132	2,324	2,333
2003	2,125	2,163	1,833	2,276	1,916	2,146	2,168	2,315	2,360	1,975	2,444	2,153	2,336	2,345
2004	2,169	2,233	1,852	2,406	2,003	2,222	2,126	2,366	2,418	1,988	2,610	2,215	2,412	2,322
2005	2,235	2,264	1,822	2,365	2,049	2,255	2,261	2,414	2,448	1,988	2,601	2,262	2,436	2,422
2006	2,237	2,284	1,803	2,412	2,019	2,281	2,249	2,456	2,497	1,989	2,571	2,261	2,503	2,449
2007	2,235	2,281	1,883	2,278	2,001	2,300	2,220	2,479	2,516	2,062	2,582	2,257	2,538	2,456
RSE	1	1	4	6	3	2	2	1	1	5	5	2	2	2

A Represents an RSE that is greater than or equal to 100 or could not be computed.
NA Not available. RSE Relative Standard Error.
S Withheld because estimate did not meet publication standards on the basis of response rate, associated standard error, or a consistency review.

6.3. Number of New One-Family Contractor-Built Houses Started by Contract Price per Square Foot and Location

Number of New One-Family Contractor-Built Houses Started by Contract Price per Square Foot and Location

(Contract price excludes value of improved lot. Components may not add to totals because of rounding.)

	Number of housing units (in thousands) by contract price									Percent distribution								
Year	Total	Under $35.00	$35.00 to $49.99	$50.00 to $59.99	$60.00 to $69.99	$70.00 to $79.99	$80.00 to $89.99	$90.00 to $99.99	$100.00 and over	Total	Under $35.00	$35.00 to $49.99	$50.00 to $59.99	$60.00 to $69.99	$70.00 to $79.99	$80.00 to $89.99	$90.00 to $99.99	$100.00 and over
United States																		
1999	208	7	33	30	37	31	24	18	29	100	3	16	15	18	15	12	8	14
2000	195	6	25	30	34	29	23	15	33	100	3	13	15	17	15	12	7	17
2001	186	4	21	24	29	30	24	19	36	100	2	11	13	15	16	13	10	19
2002	198	7	26	26	26	31	26	17	40	100	3	13	13	13	16	13	8	20
2003	205	4	22	25	32	27	26	19	49	100	2	11	12	16	13	13	9	24
2004	198	2	21	22	26	24	25	21	58	100	1	10	11	13	12	12	10	29
RSE	6	30	28	11	10	8	11	14	10	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
Inside Metropolitan Statistical Areas																		
1999	128	3	17	17	23	21	16	12	18	100	3	14	14	18	16	12	10	14
2000	115	3	12	16	21	17	15	10	22	100	3	11	14	18	15	13	9	19
2001	113	2	10	13	17	19	16	13	24	100	2	9	12	15	17	14	11	21
2002	113	3	11	14	15	20	15	10	23	100	3	10	13	14	18	14	9	20
2003	115	1	10	14	17	16	15	12	31	100	1	8	12	15	14	13	10	27
2004	108	1	8	12	13	14	15	10	35	100	1	7	11	12	13	14	9	33
RSE	8	42	32	12	13	11	17	13	14	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
Outside Metropolitan Statistical Areas																		
1999	80	3	15	13	14	10	8	5	11	100	4	19	16	17	13	10	7	14
2000	81	3	13	14	13	12	8	5	12	100	4	16	18	16	15	10	6	15
2001	73	2	11	11	12	11	9	6	12	100	3	14	15	16	15	12	8	17
2002	85	3	15	11	11	11	11	6	17	100	4	17	13	13	13	12	7	20
2003	90	3	13	12	15	11	11	7	18	100	3	14	13	17	13	12	8	20
2004	90	1	13	10	12	10	10	11	23	100	1	14	11	14	11	11	12	26
RSE	12	39	39	18	17	15	17	25	19	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
Northeast																		
1999	26	(Z)	2	3	6	4	3	3	4	100	2	10	13	22	17	11	10	14
2000	25	(Z)	2	4	5	3	4	2	4	100	1	9	17	18	13	15	8	17
2001	24	(Z)	2	2	4	4	4	2	5	100	1	10	9	18	15	15	10	21
2002	24	1	1	2	3	5	4	3	6	100	2	5	9	11	20	15	12	25
2003	23	(Z)	2	1	3	3	3	2	8	100	1	10	6	11	13	12	9	36
2004	24	(Z)	2	2	2	2	3	3	9	100	2	10	9	10	9	12	13	36
RSE	12	57	36	31	27	15	23	24	15	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)

	Midwest																	
1999	56	2	7	9	11	9	6	5	6	100	4	13	17	20	16	11	9	11
2000	49	2	6	8	8	8	6	5	8	100	4	12	15	16	15	12	9	16
2001	51	2	6	8	6	8	6	7	8	100	5	11	15	12	16	12	13	16
2002	49	3	5	5	7	8	6	5	10	100	6	11	10	15	16	12	10	20
2003	54	1	4	4	9	8	8	6	13	100	3	8	8	16	15	15	12	23
2004	41	1	2	4	5	5	6	4	15	100	1	5	9	13	13	15	9	35
RSE	21	73	69	41	37	27	24	26	15	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	South																	
1999	95	4	21	14	16	12	10	6	12	100	4	22	15	17	13	11	6	13
2000	91	4	15	15	17	13	9	5	11	100	4	17	17	19	15	10	6	12
2001	83	1	11	12	15	13	11	6	12	100	2	14	15	18	16	13	7	15
2002	92	3	17	15	14	14	11	6	13	100	3	19	17	15	15	12	6	14
2003	90	2	14	17	16	11	10	6	14	100	2	16	19	18	12	11	7	16
2004	96	1	15	13	15	13	12	8	19	100	1	16	14	16	13	12	8	19
RSE	13	40	40	18	15	12	20	21	18	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
	West																	
1999	32	(Z)	2	4	4	5	5	4	7	100	1	7	12	14	17	15	13	22
2000	30	(Z)	2	3	4	5	4	2	10	100	1	6	9	12	17	13	8	34
2001	28	(Z)	1	2	3	4	3	4	11	100	1	3	7	9	15	13	13	38
2002	33	1	2	3	2	4	6	3	12	100	3	6	9	7	13	17	8	36
2003	38	(Z)	1	3	5	5	6	4	14	100	(Z)	4	7	12	13	15	12	38
2004	37	(Z)	1	3	3	4	4	6	17	100	1	2	8	7	10	12	16	45
RSE	19	61	52	27	30	22	18	36	33	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)

- Represents zero. A Represents an RSE that is greater than or equal to 100 or could not be computed.
NA Not available. RSE Relative Standard Error.
S Withheld because estimate did not meet publication standards on the basis of response rate, associated standard error, or a consistency review.

6.4. Median and Average Contract Price of New Contractor-Built One-Family Houses Started by Location and Type of Financing

Median and Average Contract Price of New Contractor-Built One-Family Houses Started by Location and Type of Financing

(Contract price excludes value of improved lot. Medians and averages computed from unrounded figures.)

		Location						Type of Financing				
Year	Total	Inside Metro Areas	Outside Metro Areas	Northeast	Midwest	South	West	Conven-tional	FHA	VA	Rural Housing Service	Cash
	Median Contract Price											
1994	$117,600	$130,000	$90,000	(S)	$116,500	$100,800	$140,000	(NA)	(NA)	(NA)	(NA)	(NA)
1995	$125,000	$138,000	$100,000	(S)	$125,000	$115,000	(S)	(NA)	(NA)	(NA)	(NA)	(NA)
1996	$127,500	$136,500	$105,000	(S)	$128,000	$120,000	$143,000	(NA)	(NA)	(NA)	(NA)	(NA)
1997	$135,000	$150,000	$108,000	$151,300	$125,000	$125,000	$155,000	(NA)	(NA)	(NA)	(NA)	(NA)
1998	$146,700	$160,000	$122,400	$159,000	$140,000	$139,000	$183,200	(NA)	(NA)	(NA)	(NA)	(NA)
1999	$149,800	$160,600	$133,700	$166,400	$148,800	$141,400	$173,000	$151,970	$104,240	$154,570	$68,130	$151,890
2000	$152,300	$163,400	$135,900	$158,500	$152,600	$146,000	$185,000	$155,640	$117,900	$141,390	$90,510	$152,850
2001	$165,400	$179,700	$144,400	$182,700	$159,400	$155,300	$205,100	$165,470	$128,160	$156,840	(S)	$195,550
2002	$163,600	$177,300	$142,100	$185,700	$173,200	$145,900	$187,600	$164,690	$106,530	$137,280	$79,420	$178,070
2003	$172,300	$194,300	$149,700	$198,300	$176,700	$151,600	$210,100	$174,740	$131,100	(S)	(S)	$179,070
2004	$180,600	$196,500	$162,800	$189,800	$189,700	$158,100	$228,100	$182,190	$93,420	(S)	(S)	$173,030
2005	$200,200	$203,800	$192,600	$225,100	$197,900	$181,700	$252,300	$199,730	$119,000	(S)	(S)	$192,900
2006	$200,300	$220,100	$181,600	$218,700	$188,600	$194,600	$273,800	$206,270	$138,610	(S)	(S)	$197,050
2007	$205,800	$223,900	$177,000	$216,700	$184,300	$196,300	$297,500	$203,740	$180,190	(S)	(S)	$200,510
RSE	4	5	7	16	8	6	14	4	5	9	9	.
	Average Contract Price											
1994	$139,400	$154,500	$112,600	(S)	$137,800	$125,500	$166,600	(NA)	(NA)	(NA)	(NA)	(NA)
1995	$149,400	$164,000	$124,800	(S)	$145,100	$138,900	(S)	(NA)	(NA)	(NA)	(NA)	(NA)
1996	$151,900	$164,500	$128,800	(S)	$147,700	$139,400	$189,500	(NA)	(NA)	(NA)	(NA)	(NA)
1997	$165,600	$186,600	$130,800	$185,000	$151,900	$157,200	$200,700	(NA)	(NA)	(NA)	(NA)	(NA)
1998	$176,600	$196,400	$141,200	$186,600	$166,900	$159,700	$230,800	(NA)	(NA)	(NA)	(NA)	(NA)
1999	$188,900	$207,100	$160,200	$208,500	$176,000	$172,900	$245,900	$183,720	$112,180	$156,270	$121,150	$204,140
2000	$204,500	$227,700	$170,700	$207,000	$197,600	$182,700	$284,200	$196,680	$116,940	$140,070	$107,830	$246,590
2001	$211,500	$232,900	$176,900	$223,000	$195,000	$195,600	$290,100	$205,190	$131,010	$154,010	(S)	$252,930
2002	$206,200	$227,400	$178,400	$233,100	$199,500	$191,000	$244,000	$203,170	$112,450	$150,150	$83,980	$240,090
2003	$219,900	$245,500	$188,500	$244,400	$203,200	$201,700	$279,600	$218,230	$135,700	(S)	(S)	$244,010
2004	$238,100	$264,700	$207,900	$234,400	$239,800	$218,400	$292,500	$231,460	$115,970	(S)	(S)	$265,440
2005	$264,900	$276,600	$242,700	$305,100	$233,000	$241,100	$345,900	$253,570	$129,350	(S)	(S)	$295,100
2006	$283,300	$302,200	$244,900	$325,400	$226,400	$259,100	$392,400	$272,880	$137,910	(S)	(S)	$326,120
2007	$282,000	$307,400	$230,600	$334,700	$243,300	$249,500	$396,000	$273,490	$202,420	(S)	(S)	$321,680
RSE	5	6	10	19	9	6	10	6	30	16	50	12

A Represents an RSE that is greater than or equal to 100 or could not be computed.
NA Not available. RSE Relative Standard Error.
S Withheld because estimate did not meet publication standards on the basis of response rate, associated standard error, or a consistency review.

Note: Average contract prices for 1999 through 2001 have been revised using an improved procedure to adjust for extreme prices.
No extreme price adjustment was used prior to 1999.

6.5. New Residential Construction in July 2008

U.S. Census Bureau News
Joint Release
U.S. Department of Housing and Urban Development

U.S. Department of Commerce • Washington, D.C. 20233

FOR IMMEDIATE RELEASE WEDNESDAY, SEPTEMBER 17, 2008 AT 8:30 A.M. EDT

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NEW RESIDENTIAL CONSTRUCTION IN AUGUST 2008

The U.S. Census Bureau and the Department of Housing and Urban Development jointly announced the following new residential construction statistics for August 2008:

BUILDING PERMITS

Privately-owned housing units authorized by building permits in August were at a seasonally adjusted annual rate of 854,000. This is 8.9 percent (±1.5%) below the revised July rate of 937,000 and is 36.4 percent (±1.5%) below the revised August 2007 esti

Single-family authorizations in August were at a rate of 554,000; this is 5.1 percent (±1.3%) below the July figure of 584,000. Authorizations of units in buildings with five units or more were at a rate of 271,000 in August.

HOUSING STARTS

Privately-owned housing starts in August were at a seasonally adjusted annual rate of 895,000. This is 6.2 percent (±9.2%)* below the revised July estimate of 954,000 and is 33.1 percent (±6.7%) below the revised August 2007 rate of 1,337,000.

Single-family housing starts in August were at a rate of 630,000; this is 1.9 percent (±8.9%)* below the July figure of 642,000. The August rate for units in buildings with five units or more was 251,000.

HOUSING COMPLETIONS

Privately-owned housing completions in August were at a seasonally adjusted annual rate of 961,000. This is 9.8 percent (±11.5%)* below the revised July estimate of 1,065,000 and is 35.8 percent (±7.7%) below the revised August 2007 rate of 1,498,000.

Single-family housing completions in August were at a rate of 676,000; this is 17.0 percent (±10.6%) below the July figure of 814,000. The August rate for units in buildings with five units or more was 269,000.

New Residential Construction data for September 2008 will be released on Friday, October 17, 2008, at 8:30 A.M. EDT.
Our Internet site is: http://www.census.gov/newresconst

EXPLANATORY NOTES

In interpreting changes in the statistics in this release, note that month-to-month changes in seasonally adjusted statistics often show movements which may be irregular. It may take 3 months to establish an underlying trend for building permit authorizations, 4 months for total starts, and 5 months for total completions. The statistics in this release are estimated from sample surveys and are subject to sampling variability as well as nonsampling error including bias and variance from response, nonreporting, and undercoverage. Estimated relative standard errors of the most recent data are shown in the tables. Whenever a statement such as "2.5 percent (±3.2%) above" appears in the text, this indicates the range (-0.7 to +5.7 percent) in which the actual percent change is likely to have occurred. All ranges given for percent changes are 90-percent confidence intervals and account only for sampling variability. If a range does not contain zero, the change is statistically significant. If it does contain zero, the change is not statistically significant; that is, it is uncertain whether there was an increase or decrease. The same policies apply to the confidence intervals for percent changes shown in the tables. On average, the preliminary seasonally adjusted estimates of total building permits, housing starts and housing completions are revised about one percent. Explanations of confidence intervals and sampling variability can be found on our web site listed above.

* 90% confidence interval includes zero. The Census Bureau does not have sufficient statistical evidence to conclude that the actual change is different from zero.

Table 1. New Privately-Owned Housing Units Authorized in Permit-Issuing Places

[Thousands of units. Detail may not add to total because of rounding]

Period	United States				Northeast		Midwest		South		West	
		In structures with --										
	Total	1 unit	2 to 4 units	5 units or more	Total	1 unit	Total	1 unit	Total	1 unit	Total	1 unit
	Seasonally adjusted annual rate											
2007: August	1,343	928	55	360	147	86	197	150	640	476	359	216
September	1,277	870	50	357	138	79	205	145	636	457	298	189
October	1,182	811	48	323	145	76	185	133	554	415	298	187
November	1,187	767	53	367	126	70	192	131	594	406	275	160
December	1,111	714	56	341	134	71	166	116	560	378	251	149
2008: January	1,052	675	43	334	126	68	180	112	539	365	207	130
February	981	646	40	295	105	66	130	97	504	350	242	133
March	932	621	37	274	111	60	126	93	502	340	193	128
April	982	649	38	295	108	60	157	110	499	344	218	135
May	978	635	34	309	137	58	147	109	460	330	234	138
June	1,138	616	33	489	295	53	148	103	459	321	236	139
July[r]	937	584	33	320	105	56	147	99	487	306	198	123
August[p]	**854**	**554**	**29**	**271**	**83**	**60**	**148**	**92**	**439**	**284**	**184**	**118**
Average RSE (%)[1]	1	1	5	1	2	2	3	4	1	1	1	2
Percent Change:												
August 2008 from July 2008	***-8.9%***	***-5.1%***	***-12.1%***	***-15.3%***	***-21.0%***	***7.1%***	***0.7%***	***-7.1%***	***-9.9%***	***-7.2%***	***-7.1%***	***-4.1%***
90% Confidence Interval[3]	*± 1.5*	*± 1.3*	*± 2.2*	*± 4.6*	*± 7.2*	*± 8.4*	*± 6.9*	*± 8.9*	*± 1.3*	*± 1.6*	*± 2.1*	*± 2.6*
August 2008 from August 2007	***-36.4%***	***-40.3%***	***-47.3%***	***-24.7%***	***-43.5%***	***-30.2%***	***-24.9%***	***-38.7%***	***-31.4%***	***-40.3%***	***-48.7%***	***-45.4%***
90% Confidence Interval[3]	*± 1.5*	*± 1.1*	*± 3.4*	*± 3.6*	*± 6.7*	*± 7.8*	*± 6.6*	*± 8.5*	*± 1.0*	*± 1.2*	*± 1.9*	*± 2.4*
	Not seasonally adjusted											
2006	1,838.9	1,378.2	76.6	384.1	174.6	103.4	279.4	209.3	929.7	726.2	455.2	339.3
2007	1,398.4	979.9	59.6	359.0	150.6	83.7	211.7	153.8	692.2	507.5	343.9	234.9
RSE (%)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
2007: Year to Date[2]	1,017.7	739.8	42.4	235.5	106.7	61.0	153.0	115.4	504.3	379.5	253.6	184.0
2008: Year to Date[2]	678.2	434.8	23.8	219.5	92.9	40.6	99.9	69.9	338.1	231.5	147.3	92.8
RSE (%)	1	1	2	(Z)	2	3	2	2	1	1	1	1
Year to Date Percent Change[4]	***-33.4%***	***-41.2%***	***-43.9%***	***-6.8%***	***-13.0%***	***-33.4%***	***-34.7%***	***-39.5%***	***-33.0%***	***-39.0%***	***-41.9%***	***-49.6%***
90% Confidence Interval[3]	*± 0.8*	*± 1.0*	*± 2.3*	*± 1.1*	*± 3.4*	*± 5.1*	*± 2.5*	*± 3.0*	*± 0.6*	*± 0.7*	*± 1.2*	*± 1.5*
2007: August	126.0	87.5	5.2	33.3	14.3	8.4	19.0	14.7	59.1	44.3	33.5	20.1
September	100.5	66.6	3.9	30.0	11.2	6.4	17.7	12.2	47.8	33.7	23.8	14.3
October	103.8	70.7	4.3	28.8	13.7	7.2	18.0	13.2	45.9	34.5	26.2	15.9
November	89.5	54.7	4.3	30.5	10.1	5.2	14.9	9.9	44.3	28.8	20.2	10.8
December	77.8	45.2	4.0	28.7	9.8	4.6	10.0	6.2	40.4	24.9	17.6	9.6
2008: January	75.9	47.5	2.8	25.6	8.0	4.2	10.1	5.9	43.0	28.2	14.8	9.2
February	73.4	47.5	2.8	23.0	6.4	3.8	7.9	5.3	40.3	28.5	18.8	9.9
March	77.4	53.6	3.0	20.8	8.4	4.7	9.9	7.5	43.2	30.2	15.9	11.2
April	89.5	62.7	3.4	23.4	9.7	5.7	15.7	11.5	44.4	32.4	19.8	13.1
May	90.3	61.1	2.9	26.2	12.6	5.6	14.2	11.4	41.6	30.7	21.9	13.5
June	108.1	58.7	2.9	46.5	29.7	5.2	14.4	10.2	41.6	29.4	22.5	13.8
July[r]	83.5	55.0	3.0	25.5	9.8	5.6	14.3	10.1	42.2	27.7	17.2	11.6
August[p]	**73.5**	**47.4**	**2.4**	**23.7**	**7.3**	**5.4**	**13.5**	**8.2**	**37.4**	**24.0**	**15.3**	**9.8**
Average RSE (%)[1]	1	1	5	1	2	2	3	4	1	1	1	2

[p]Preliminary. [r]Revised. RSE Relative standard error. S Does not meet publication standards because tests for identifiable and stable seasonality do not meet reliability standards.
X Not applicable. Z Relative standard error is less than 0.5 percent.

[1]Average RSE for the latest 6-month period. [2]Reflects revisions not distributed to months.

[3] See the Explanatory Notes in the accompanying text for an explanation of 90% confidence intervals. [4] Computed using unrounded data.

Table 2. New Privately-Owned Housing Units Authorized, but Not Started, at End of Period

[Not seasonally adjusted. Thousands of units. Detail may not add to total because of rounding]

Period	United States				Northeast		Midwest		South		West	
		In structures with --										
	Total	1 unit	2 to 4 units	5 units or more	Total	1 unit	Total	1 unit	Total	1 unit	Total	1 unit
2007: August	195.7	119.4	7.3	69.0	25.7	12.4	19.5	11.2	101.0	63.7	49.5	32.2
September	190.1	113.1	6.7	70.3	22.5	12.3	20.9	11.8	97.9	59.3	48.9	29.7
October	177.7	107.2	5.8	64.7	20.7	10.9	19.4	8.9	88.1	57.3	49.5	30.0
November	175.2	107.0	5.0	63.2	19.6	10.6	18.2	9.3	87.7	57.7	49.7	29.5
December	178.3	103.2	5.9	69.3	20.8	10.3	19.6	9.4	87.4	53.9	50.5	29.6
2008: January	182.0	105.3	6.0	70.7	20.7	9.7	21.1	10.3	91.3	55.0	48.9	30.3
February	176.7	104.9	6.4	65.3	19.6	9.8	20.1	10.4	87.9	55.6	49.1	29.1
March	168.1	99.8	5.6	62.6	16.1	9.7	19.7	9.8	86.6	52.7	45.7	27.7
April	164.8	100.5	5.0	59.3	17.1	9.5	20.4	11.7	85.2	53.6	42.1	25.6
May	163.7	98.4	5.5	59.9	17.6	8.9	21.3	11.6	81.5	51.6	43.3	26.2
June[r]	166.2	94.3	5.5	66.4	24.1	8.7	20.9	11.1	75.7	47.3	45.5	27.2
July[r]	159.2	91.7	5.5	62.0	18.7	8.3	19.0	10.3	77.7	47.4	43.9	25.6
August[p]	**152.6**	**84.6**	**5.3**	**62.7**	**13.7**	**7.8**	**19.0**	**8.2**	**80.0**	**46.7**	**39.8**	**22.0**
Average RSE (%)[1]	5	7	14	7	11	18	8	11	8	9	11	15
Percent Change: [2]												
August 2008 from July 2008	***-4.1%***	***-7.8%***	***-3.7%***	***1.2%***	***-26.4%***	***-7.1%***	***0.4%***	***-20.8%***	***3.0%***	***-1.6%***	***-9.3%***	***-14.1%***
90% Confidence Interval [3]	*± 3.2*	*± 3.4*	*± 9.6*	*± 6.4*	*± 10.7*	*± 15.4*	*± 9.1*	*± 13.3*	*± 5.2*	*± 3.8*	*± 4.4*	*± 5.2*
August 2008 from August 2007	***-22.1%***	***-29.2%***	***-27.5%***	***-9.1%***	***-46.5%***	***-37.3%***	***-2.5%***	***-27.1%***	***-20.8%***	***-26.7%***	***-19.6%***	***-31.7%***
90% Confidence Interval [3]	*± 6.1*	*± 6.0*	*± 27.7*	*± 12.5*	*± 11.0*	*± 16.3*	*± 20.1*	*± 13.6*	*± 10.7*	*± 9.8*	*± 8.3*	*± 7.4*

[p]Preliminary. [r]Revised. RSE Relative Standard Error.

[1]Average RSE for the latest 6-month period. [2] Computed using unrounded data.

[3] See the Explanatory Notes in the accompanying text for an explanation of 90% confidence intervals.

Note: These data represent the number of housing units authorized in all months up to and including the last day of the reporting period and not started as of that date without regard to the months of original permit issuance. Cancelled, abandoned, expired, and revoked permits are excluded.

Table 3. New Privately-Owned Housing Units Started

[Thousands of units. Detail may not add to total because of rounding]

Period	United States				Northeast		Midwest		South		West	
		In structures with --										
	Total	1 unit	2 to 4 units	5 units or more	Total	1 unit	Total	1 unit	Total	1 unit	Total	1 unit
	Seasonally adjusted annual rate											
2007: August	1,337	968	(S)	332	98	75	240	171	696	507	303	215
September	1,185	936	(S)	220	143	77	170	150	597	492	275	217
October	1,275	884	(S)	351	161	96	204	170	629	433	281	185
November	1,179	816	(S)	342	128	82	209	139	587	422	255	173
December	1,000	779	(S)	211	101	74	137	120	549	435	213	150
2008: January	1,064	750	(S)	287	137	103	156	119	531	403	240	125
February	1,107	722	(S)	356	129	67	154	110	577	376	247	169
March	988	711	(S)	261	115	67	135	108	515	380	223	156
April	1,004	681	(S)	308	93	59	164	104	504	353	243	165
May	982	682	(S)	280	123	66	139	113	500	365	220	138
June[r]	1,089	663	(S)	404	251	63	139	113	490	348	209	139
July[r]	954	642	(S)	301	179	70	154	109	435	319	186	144
August[p]	**895**	**630**	**(S)**	**251**	**153**	**64**	**133**	**115**	**403**	**302**	**206**	**149**
Average RSE (%)[1]	4	4	(X)	11	12	14	8	9	6	6	9	8
Percent Change:												
August 2008 from July 2008	***-6.2%***	***-1.9%***	***(S)***	***-16.6%***	***-14.5%***	***-8.6%***	***-13.6%***	***5.5%***	***-7.4%***	***-5.3%***	***10.8%***	***3.5%***
90% Confidence Interval[2]	*± 9.2*	*± 8.9*	*(X)*	*± 19.3*	*± 22.7*	*± 37.3*	*± 17.2*	*± 20.4*	*± 16.6*	*± 13.6*	*± 20.6*	*± 15.5*
August 2008 from August 2007	***-33.1%***	***-34.9%***	***(S)***	***-24.4%***	***56.1%***	***-14.7%***	***-44.6%***	***-32.7%***	***-42.1%***	***-40.4%***	***-32.0%***	***-30.7%***
90% Confidence Interval[2]	*± 6.7*	*± 4.9*	*(X)*	*± 22.0*	*± 42.6*	*± 32.2*	*± 7.5*	*± 8.7*	*± 9.0*	*± 5.5*	*± 12.3*	*± 9.5*
	Not seasonally adjusted											
2006	1,800.9	1,465.4	42.7	292.8	167.2	118.0	279.5	235.3	910.3	756.5	443.8	355.6
2007	1,355.0	1,046.0	31.7	277.3	142.9	93.0	210.1	171.1	681.1	539.5	320.9	242.4
RSE (%)	1	1	9	3	3	5	2	2	2	2	2	2
2007: Year to Date	980.8	779.1	22.7	179.0	97.4	65.8	149.7	122.9	494.2	403.5	239.4	187.0
2008: Year to Date	681.2	470.1	12.3	198.9	97.8	45.6	97.5	74.7	335.7	246.7	150.2	103.0
RSE (%)	1	2	10	4	3	4	3	3	2	3	2	3
Year to Date Percent Change[3]	***-30.5%***	***-39.7%***	***-45.8%***	***11.1%***	***0.4%***	***-30.6%***	***-34.9%***	***-39.2%***	***-32.1%***	***-38.9%***	***-37.3%***	***-44.9%***
90% Confidence Interval[2]	*± 1.7*	*± 1.7*	*± 10.6*	*± 9.4*	*± 8.6*	*± 7.9*	*± 4.2*	*± 2.3*	*± 2.2*	*± 2.1*	*± 3.0*	*± 3.8*
2007: August	121.2	86.6	3.5	31.1	9.5	7.4	22.9	16.4	61.5	43.8	27.3	19.0
September	101.5	78.6	2.6	20.3	12.7	6.6	15.6	13.8	50.2	40.6	23.0	17.7
October	115.0	77.4	3.8	33.8	15.0	8.8	20.0	16.8	55.2	36.3	24.7	15.5
November	88.8	58.6	1.8	28.4	10.4	6.5	16.7	10.9	42.5	28.8	19.2	12.4
December	68.9	52.3	0.8	15.9	7.4	5.4	8.0	6.7	38.9	30.3	14.6	9.9
2008: January	70.8	48.5	1.9	20.4	8.2	5.8	8.2	5.5	38.0	28.9	16.5	8.3
February	78.4	51.9	2.0	24.5	7.6	3.3	8.7	5.7	44.2	30.4	17.9	12.5
March	82.2	61.5	1.2	19.5	8.6	5.0	9.7	7.7	45.2	35.1	18.6	13.6
April	89.5	62.6	1.3	25.7	8.2	5.3	15.0	10.0	45.3	32.6	21.1	14.6
May	91.7	66.1	1.7	23.9	11.7	6.8	14.2	12.0	44.9	33.4	20.8	13.8
June[r]	102.5	65.2	1.9	35.3	23.0	6.6	14.1	11.8	45.8	33.4	19.5	13.4
July[r]	86.8	59.3	1.0	26.5	16.1	6.5	15.2	11.2	37.9	27.7	17.6	13.9
August[p]	**79.3**	**55.0**	**1.3**	**23.1**	**14.4**	**6.2**	**12.3**	**10.7**	**34.4**	**25.1**	**18.2**	**12.9**
Average RSE (%)[1]	4	4	26	11	12	14	8	9	6	6	9	8

[p]Preliminary. [r]Revised. RSE Relative standard error. S Does not meet publication standards because tests for identifiable and stable seasonality do not meet reliability standards.
X Not applicable.

[1]Average RSE for the latest 6-month period. [2] See the Explanatory Notes in the accompanying text for an explanation of 90% confidence intervals.

[3] Computed using unrounded data.

Table 4. New Privately-Owned Housing Units Under Construction at End of Period

[Thousands of units. Detail may not add to total because of rounding]

Period	United States				Northeast		Midwest		South		West	
		In structures with --										
	Total	1 unit	2 to 4 units	5 units or more	Total	1 unit	Total	1 unit	Total	1 unit	Total	1 unit
	Seasonally adjusted											
2007: August	1,125	683	(S)	411	163	77	178	121	475	300	309	185
September	1,110	667	(S)	412	165	74	170	117	471	295	304	181
October	1,096	647	(S)	417	161	71	169	117	465	283	301	176
November	1,077	623	(S)	424	161	70	170	114	455	273	291	166
December	1,055	608	(S)	417	157	68	166	111	448	269	284	160
2008: January	1,034	590	(S)	416	157	69	165	109	435	260	277	152
February	1,024	580	(S)	416	159	70	162	105	428	253	275	152
March	1,013	563	(S)	423	161	68	158	102	423	246	271	147
April	1,006	550	(S)	429	158	64	157	99	420	240	271	147
May	989	530	(S)	434	156	62	152	95	415	233	266	140
June[r]	977	511	(S)	442	169	62	145	89	403	226	260	134
July[r]	956	492	(S)	441	170	60	145	88	391	217	250	127
August[p]	**947**	**485**	**(S)**	**440**	**175**	**60**	**141**	**86**	**380**	**212**	**251**	**127**
Average RSE (%)[1]	2	3	(X)	3	4	9	6	7	3	4	5	7
Percent Change:												
August 2008 from July 2008	***-0.9%***	***-1.4%***	***(S)***	***-0.2%***	***2.9%***	***0.0%***	***-2.8%***	***-2.3%***	***-2.8%***	***-2.3%***	***0.4%***	***0.0%***
90% Confidence Interval[2]	*± 0.9*	*± 1.0*	*(X)*	*± 1.5*	*± 1.4*	*± 2.2*	*± 1.7*	*± 2.2*	*± 1.9*	*± 1.6*	*± 1.6*	*± 2.1*
August 2008 from August 2007	***-15.8%***	***-29.0%***	***(S)***	***7.1%***	***7.4%***	***-22.1%***	***-20.8%***	***-28.9%***	***-20.0%***	***-29.3%***	***-18.8%***	***-31.4%***
90% Confidence Interval[2]	*± 2.2*	*± 2.4*	*(X)*	*± 4.8*	*± 6.3*	*± 6.8*	*± 6.1*	*± 6.2*	*± 3.2*	*± 2.8*	*± 3.8*	*± 5.6*
	Not seasonally adjusted											
2007: August	1,158.5	717.9	31.1	409.5	166.7	80.9	185.9	129.3	487.1	312.7	318.8	195.1
September	1,137.9	695.4	30.8	411.7	168.4	77.6	177.4	124.4	481.0	305.6	311.1	187.8
October	1,119.9	668.1	31.9	419.9	164.4	73.5	177.5	124.8	472.1	289.2	306.0	180.7
November	1,085.2	626.8	30.7	427.7	163.4	71.1	174.0	117.4	455.3	271.8	292.5	166.4
December	1,025.0	579.1	29.6	416.3	155.9	67.0	162.5	107.2	431.6	253.3	274.9	151.6
2008: January	1,002.4	559.2	28.4	414.8	155.0	67.0	158.3	102.1	421.0	246.4	268.1	143.8
February	989.6	548.1	27.6	414.0	153.4	64.9	152.5	96.1	416.3	242.0	267.4	145.0
March	988.6	540.5	27.1	421.0	156.2	64.0	150.1	94.6	416.6	240.4	265.6	141.5
April	999.9	542.5	26.6	430.8	156.4	62.4	152.9	94.9	421.3	240.8	269.4	144.5
May	995.4	535.9	25.2	434.4	155.7	61.7	151.2	94.3	419.8	237.2	268.8	142.7
June[r]	992.6	525.2	24.4	443.0	171.1	63.4	147.3	91.5	410.0	232.7	264.3	137.6
July[r]	982.4	514.5	23.0	444.8	173.7	62.6	150.1	92.7	400.7	225.5	257.9	133.7
August[p]	**966.2**	**507.4**	**22.3**	**436.5**	**176.5**	**62.5**	**145.8**	**91.4**	**387.9**	**220.8**	**256.0**	**132.6**
Average RSE (%)[1]	2	3	10	3	4	9	6	7	3	4	5	7

[p]Preliminary. [r]Revised. RSE Relative standard error. S Does not meet publication standards because tests for identifiable and stable seasonality do not meet reliability standards.
X Not applicable.

[1]Average RSE for the latest 6-month period. [2] See the Explanatory Notes in the accompanying text for an explanation of 90% confidence intervals.

Table 5. New Privately-Owned Housing Units Completed

[Thousands of units. Detail may not add to total because of rounding]

Period	United States				Northeast		Midwest		South		West	
		In structures with --										
	Total	1 unit	2 to 4 units	5 units or more	Total	1 unit	Total	1 unit	Total	1 unit	Total	1 unit
	Seasonally adjusted annual rate											
2007: August	1,498	1,224	(S)	251	149	116	178	156	773	630	398	322
September	1,378	1,101	(S)	246	139	96	245	192	651	539	343	274
October	1,401	1,133	(S)	240	184	135	209	170	696	583	312	245
November	1,404	1,140	(S)	234	124	93	216	193	686	545	378	309
December	1,329	1,026	(S)	287	143	94	194	175	645	498	347	259
2008: January	1,331	998	(S)	291	125	80	191	169	680	512	335	237
February	1,251	906	(S)	315	101	67	228	178	682	485	240	176
March	1,192	909	(S)	269	104	83	183	150	613	460	292	216
April	1,033	808	(S)	192	117	90	146	124	523	416	247	178
May	1,144	877	(S)	249	135	88	182	150	574	452	253	187
June[r]	1,131	844	(S)	266	85	62	201	170	582	420	263	192
July[r]	1,065	814	(S)	229	130	86	138	118	523	399	274	211
August[p]	**961**	**676**	**(S)**	**269**	**83**	**59**	**168**	**128**	**496**	**331**	**214**	**158**
Average RSE (%)[1]	5	5	(X)	13	14	14	12	12	8	8	8	10
Percent Change:												
August 2008 from July 2008	***-9.8%***	***-17.0%***	***(S)***	***17.5%***	***-36.2%***	***-31.4%***	***21.7%***	***8.5%***	***-5.2%***	***-17.0%***	***-21.9%***	***-25.1%***
90% Confidence Interval[2]	*± 11.5*	*± 10.6*	*(X)*	*± 42.3*	*± 24.6*	*± 23.6*	*± 28.6*	*± 25.0*	*± 16.9*	*± 15.0*	*± 18.0*	*± 17.6*
August 2008 from August 2007	***-35.8%***	***-44.8%***	***(S)***	***7.2%***	***-44.3%***	***-49.1%***	***-5.6%***	***-17.9%***	***-35.8%***	***-47.5%***	***-46.2%***	***-50.9%***
90% Confidence Interval[2]	*± 7.7*	*± 6.5*	*(X)*	*± 34.6*	*± 16.5*	*± 15.8*	*± 20.8*	*± 17.1*	*± 12.1*	*± 9.2*	*± 12.0*	*± 9.9*
	Not seasonally adjusted											
2006	1,979.4	1,654.5	40.8	284.2	179.1	128.3	325.1	285.5	986.7	825.8	488.6	414.9
2007	1,502.8	1,218.4	31.4	253.0	144.8	104.6	222.7	188.6	766.1	631.5	369.3	293.8
RSE (%)	1	1	9	4	6	8	2	2	2	2	3	2
2007: Year to Date	1,008.1	816.9	22.6	168.6	91.2	65.6	142.0	119.1	528.4	436.7	246.4	195.6
2008: Year to Date	725.7	537.9	15.7	172.1	69.5	47.7	111.6	90.8	374.8	275.8	169.7	123.5
RSE (%)	2	2	13	6	5	5	5	5	4	3	3	3
Year to Date Percent Change[3]	***-28.0%***	***-34.2%***	***-30.6%***	***2.1%***	***-23.8%***	***-27.2%***	***-21.4%***	***-23.7%***	***-29.1%***	***-36.8%***	***-31.1%***	***-36.8%***
90% Confidence Interval[2]	*± 2.8*	*± 2.2*	*± 16.5*	*± 12.6*	*± 11.3*	*± 10.5*	*± 6.6*	*± 6.1*	*± 4.4*	*± 3.3*	*± 4.8*	*± 3.9*
2007: August	136.9	107.9	2.5	26.5	14.1	10.7	16.6	14.2	70.0	54.9	36.2	28.1
September	123.2	99.8	2.6	20.7	12.2	8.6	22.9	18.4	57.2	47.7	30.9	25.1
October	126.0	103.4	2.4	20.3	16.6	12.5	19.4	16.1	62.1	52.5	28.0	22.3
November	118.7	98.9	2.3	17.5	10.9	8.6	19.9	18.2	56.6	46.0	31.3	26.1
December	126.8	99.4	1.5	25.8	13.8	9.4	18.4	16.8	61.8	48.5	32.7	24.8
2008: January	93.5	69.0	3.1	21.4	8.7	5.4	12.9	11.3	48.4	36.0	23.6	16.4
February	87.0	63.2	2.1	21.7	7.2	4.9	15.2	11.8	48.1	34.5	16.5	12.1
March	89.8	69.0	1.0	19.8	7.0	5.4	12.6	10.2	47.1	35.9	23.1	17.5
April	79.6	62.0	2.5	15.0	8.6	6.5	11.2	9.5	40.6	32.3	19.0	13.6
May	96.5	73.6	1.5	21.4	11.5	7.4	15.2	12.5	48.5	38.0	21.3	15.6
June[r]	99.7	73.6	1.9	24.2	7.6	5.5	17.3	14.5	51.4	36.6	23.4	16.9
July[r]	89.9	68.0	1.9	19.9	10.7	6.9	11.3	9.6	44.7	33.9	23.1	17.6
August[p]	**89.7**	**59.5**	**1.7**	**28.6**	**8.1**	**5.6**	**15.8**	**11.5**	**46.0**	**28.5**	**19.8**	**13.8**
Average RSE (%)[1]	5	5	30	13	14	14	12	12	8	8	8	10

[p]Preliminary. [r]Revised. RSE Relative standard error. S Does not meet publication standards because tests for identifiable and stable seasonality do not meet reliability standards.
X Not applicable.

[1]Average RSE for the latest 6-month period. [2] See the Explanatory Notes in the accompanying text for an explanation of 90% confidence intervals.

[3] Computed using unrounded data.