FIRES STARTING WITH FLAMMABLE GAS OR FLAMMABLE OR COMBUSTIBLE LIQUID

John R. Hall, Jr.

February 2014

National Fire Protection Association
Fire Analysis and Research Division

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Abstract

In 2007-2011, U.S. municipal fire departments responded to an estimated average of 51,600 fires per year starting with ignition of a flammable gas and another 160,910 fires per year starting with ignition of a flammable or combustible liquid. The flammable gas fires resulted in an estimated 168 civilian deaths, 1,029 civilian injuries, and $644 million in direct property damage per year. The flammable or combustible liquid fires resulted in an estimated 454 civilian deaths, 3,910 civilian injuries, and $1.5 billion in direct property damage per year.

Flammable gas fires nearly all involve natural gas or LP gas. Flammable or combustible liquid fires nearly all involve unclassified or unknown-type flammable or combustible liquid, Class IIIB combustible liquids, Class II combustible liquids, or gasoline. Most fires involve gas or liquid fuels for heating or cooking or involve cooking oils used as a medium to heat food during cooking.

Flammable gas or flammable or combustible liquid fires declined substantially from 1980 to 1998, then jumped when NFIRS Version 5.0 was introduced. More recent years have generally shown no consistent trend up or down.

Keywords: fire statistics, gas fires, natural gas, LP-gas, flammable liquid, combustible liquid, gasoline

Acknowledgements

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We are also grateful to the U.S. Fire Administration for its work in developing, coordinating, and maintaining NFIRS.

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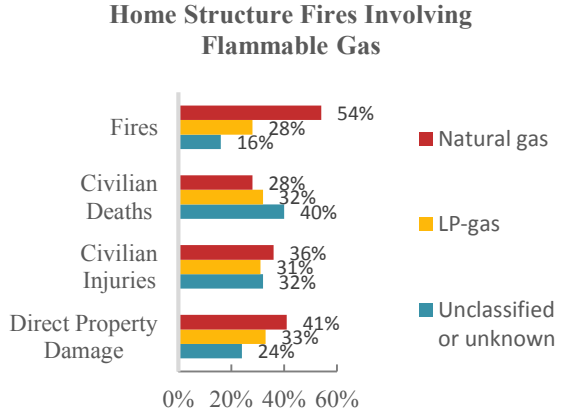
Fires Starting With Flammable Gas Fact Sheet

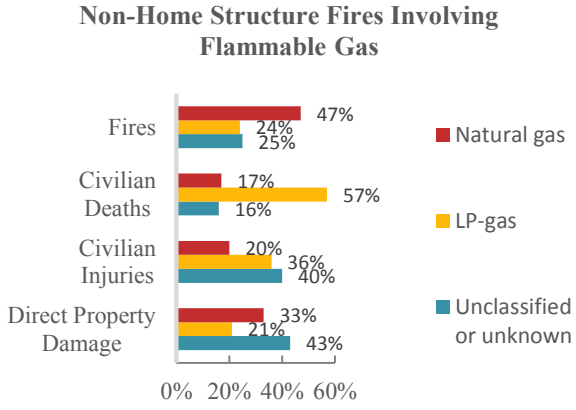
In 2007-2011, U.S. municipal fire departments responded to an estimated average of **51,600 fires** per year involving ignition of flammable gas as the type of material first ignited, including **20,260 fires** per year in or at **homes** and **31,340 fires** per year in or at **other properties**.

These fires caused estimated losses of:

- **168** civilian deaths per year
- **1,029** civilian injuries per year, and
- **$644 million** per year in direct property damage.

Nearly all these fires involve natural gas, LP-gas, or unclassified or unknown-type gas. The other specific gases identified – acetylene, anesthetic gas, and hydrogen – each accounted for no more than 1% of fires and losses.





Natural gas accounted for 44% more user households than LP-gas in 2009, but their numbers of home fires and losses (combining structure, vehicle and outdoor firs) were comparable. However, the uses associated with these fires were quite different, with many LP-gas fires involving gas grills and natural gas fires more associated with central warm-air heating equipment. The **fire risks** involved have more to do with the risks associated with primary vs. secondary cooking and heating equipment and less to do with the properties of the gases.

Leak or break was a factor contributing to ignition for 22% of home structure fires starting with flammable gas and for 28% of non-home structure fires starting with flammable gas.

Fires Starting With Flammable or Combustible Liquids Fact Sheet

In 2007-2011, U.S. municipal fire departments responded to an estimated average of **160,910 fires** per year involving ignition of a flammable or combustible liquid as the type of material first ignited, including **55,390 fires** per year in or at **homes** and **105,520 fires** per year in or at **other properties**.

These fires caused estimated losses of:

- **454** civilian deaths per year,
- **3,910** civilian injuries per year, and
- **$1.5 billion** in direct property damage per year.

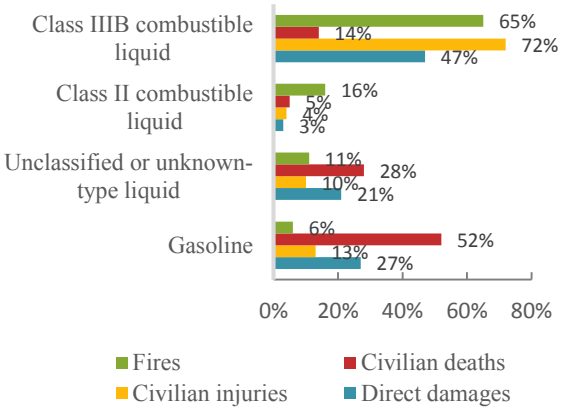
Structure Fires Beginning With Flammable or Combustible Liquid

	Home	Non-Home
Fires	43,620	11,710
Civilian deaths	196	34
Civilian injuries	2,559	458
Direct property damage (in millions)	$469	$374

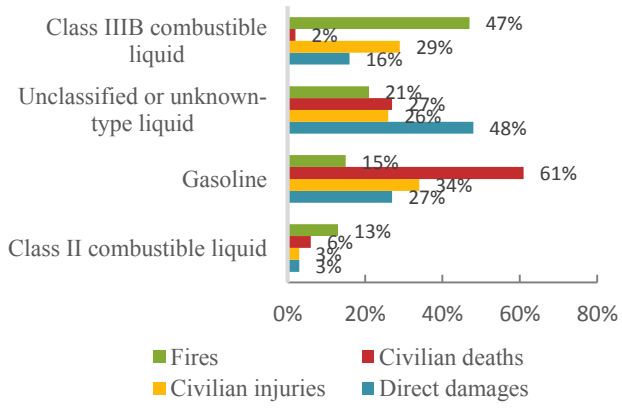
The following types of flammable or combustible liquid can be distinguished:

- Class IA flammable liquid (including pentane and ethyl ether)
- Class IB flammable liquid (including acetone, ethyl alcohol, and methyl ethyl ketone)
- Gasoline
- Class IC flammable liquid (including turpentine and butyl alcohol)
- Class II combustible liquid (including the most commonly used home heating liquid fuels, kerosene and Nos. 1 and 2 fuel oil; also diesel and paint thinner)
- Class IIIA combustible liquid (including Nos. 4, 5, or 6 fuel oil, typically used in commercial and industrial heating; also creosote oil, which may be created in wood fires, and cottonseed oil)
- Class IIIB combustible liquid (including cooking oil, transformer oil or lubricant oil)
- Unclassified or unknown-type liquid

Leading Types of Flammable or Combustible Liquid First Ignited in Home Structure Fires



Leading Types of Flammable or Combustible Liquid First Ignited in Non-Home Structure Fires



Section 1. Flammable Gas

Flammable gases are recorded under Type of Material First Ignited. The principal flammable gases identified separately by the National Fire Incident Reporting System (NFIRS) are:

- Natural gas, and
- LP-gas, which includes butane and propane.

Natural gas is lighter than air, while LP-gas is heavier than air.

Other gases with distinct reporting categories in NFIRS are:

- Acetylene gas,
- Anesthetic gas, and
- Hydrogen.

There is a category for "other" flammable gas, which may be any of the above gases that could not be positively identified and may be a flammable gas not listed above.

During 2007-2011, an average of 51,600 fires per year were reported as having begun with the ignition of a flammable gas as the type of material first ignited.
These fires caused an average of 168 civilian deaths per year, 1,029 civilian injuries per year, and $644 million in direct property damage per year.

Tables 1-A.1, 1-A.2, and 1-A.3 show how these fires divide, first into homes versus any other property use, and within those two groups, into structure, vehicle, and outdoor or other fires. Nearly all home losses are in structure fires, but nearly half of the home fires are not structure fires. Vehicle fires are a much larger share of non-home fires than home fires.

Table 1-A.1. Fires Starting With Ignition of Flammable Gas
2007-2011 Annual Averages, by Property Use

Incident Type	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Home	20,260	(39%)	111	(66%)	589	(57%)	$189	(29%)
Non-home	31,340	(61%)	57	(34%)	440	(43%)	$455	(71%)
Total	51,600	(100%)	168	(100%)	1,029	(100%)	$644	(100%)

Note: See text box on p.2 for details on calculations. Source: NFIRS and NFPA survey.

Table 1-A.2. Home Fires Starting With Ignition of Flammable Gas
2007-2011 Annual Averages, by Incident Type

Incident Type	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Structure fire	10,950	(54%)	108	(97%)	521	(88%)	$181	(96%)
Vehicle fire	1,080	(5%)	2	(2%)	22	(4%)	$5	(3%)
Outdoor or other fire	8,230	(41%)	1	(1%)	46	(8%)	$3	(2%)
Total	20,260	(100%)	111	(100%)	589	(100%)	$189	(100%)

Note: See text box for details on calculations. Sources: NFIRS and NFPA survey.

Data Sources, Definitions and Conventions Used in This Section

Unless otherwise specified, the statistics in this analysis are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to federal or state agencies or industrial fire brigades. These estimates are projections based on the detailed information collected in Version 5.0 of the U.S. Fire Administration's National Fire Incident Reporting System (NFIRS 5.0) and the National Fire Protection Association's (NFPA's) annual fire department experience survey. In general, any fire that occurs in or on a structure is considered a structure fire, even if the fire was limited to contents and the building itself was not damaged.

"Home" includes one- and two-family homes, manufactured homes, and multi-family housing, including apartments.

Flammable gases are identified in NFIRS 5.0 Type of Material First Ignited:

10 - Unclassified or unknown type flammable gas, including benzene, benzol, carbon disulfide, carbon monoxide, ethylene, ethylene oxide, and vinyl chloride. Corresponds to codes 10 (unknown) and 19 (unclassified) in earlier version of NFIRS and may include codes 13 (manufactured gas) and 17 (specialty gas other than anesthetic) in earlier versions of NFIRS.
11 – Natural gas, including methane and swamp gas.
12 – LP-gas, including butane, propane, and butane-air mixture, which was coded separately as LP-City gas in earlier versions of NFIRS.
13 – Anesthetic gas, which was code 15 in earlier versions of NFIRS.
14 – Acetylene gas, which was code 16 in earlier versions of NFIRS.
15 – Hydrogen, which was not separately identified in earlier version of NFIRS.

NFIRS 5.0 includes a category of structure fires collectively referred to as "confined fires," identified by incident type. These include confined cooking fires, confined chimney or flue fires, confined trash fires, confined fuel burner or boiler fires, confined commercial compactor fires, and confined incinerator fires (incident type 113-118). Losses are generally minimal in these fires, which by definition, are assumed to have been limited to the object of origin. Although detailed data is not required for these fires, it is sometimes present.

Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Property damage has not been adjusted for inflation. Fires are rounded to the nearest ten, civilian deaths and injuries to the nearest one, and direct property damage to the nearest million. Additional details on the methodology may be found in Appendix A.

Reporting of Type of Material First Ignited is not required if Item First Ignited is coded in the range of 70 to 99. As with confined fires, the field is nevertheless reported for many fires, but the percentage of unknowns and blanks is higher. Fires are analyzed separately for (1) non-confined structure fires, (2) confined structure fires, (3) vehicle fires, (4) outdoor or other vegetation fires, and (5) outdoor or other non-vegetation fires (principally trash). For each of these, fires are analyzed separately for Item First Ignited 70-99 and Item First Ignited not 70-99.

Table 1-A.3. Non-Home Fires Starting With Ignition of Flammable Gas
2007-2011 Annual Averages, by Incident Type

Incident Type	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Structure fire	4,530	(14%)	14	(24%)	210	(48%)	$136	(30%)
Vehicle fire	12,520	(40%)	38	(66%)	168	(38%)	$108	(24%)
Outdoor or other fire	14,290	(46%)	6	(10%)	63	(14%)	$211	(46%)
Total	31,340	(100%)	57	(100%)	440	(100%)	$455	(100%)

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

Natural gas accounts for the largest shares of all fires and of all structure fires starting with ignition of any known flammable gas.
LP-gas shares are smaller, but larger for deaths. Vehicle fires starting with ignition of flammable gas are overwhelmingly dominated by unclassified or unknown-type gas. The other identified gases – acetylene, hydrogen, and anesthetic gas – all account for small shares. Tables 1-B.1 to 1-B.4 show all fires, all structure fires, home structure fires, and non-home structure fires, respectively, by type of gas ignited.

Table 1-B.1. Fires Starting With Ignition of Flammable Gas,
2007-2011 Annual Averages, by Type of Gas

Type of Gas	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Unclassified or unknown-type gas	22,520	(44%)	85	(51%)	403	(39%)	$233	(36%)
Natural gas	13,730	(27%)	35	(21%)	254	(25%)	$303	(47%)
LP-gas	13,340	(26%)	47	(28%)	349	(34%)	$100	(16%)
Acetylene	1,180	(2%)	0	(0%)	11	(1%)	$5	(1%)
Anesthetic gas	620	(1%)	0	(0%)	1	(0%)	$1	(0%)
Hydrogen	210	(0%)	1	(1%)	12	(1%)	$2	(0%)
Total	51,600	(100%)	168	(100%)	1,029	(100%)	$644	(100%)

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

Table 1-B.2. Structure Fires Starting With Ignition of Flammable Gas, 2007-2011 Annual Averages, by Type of Gas

Type of Gas	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Natural gas	8,080	(52%)	32	(27%)	227	(31%)	$118	(37%)
LP-gas	4,190	(27%)	43	(35%)	237	(32%)	$89	(28%)
Unclassified or unknown-type gas	2,900	(19%)	46	(37%)	251	(34%)	$103	(33%)
Acetylene	190	(1%)	0	(0%)	6	(1%)	$4	(1%)
Hydrogen	50	(0%)	1	(1%)	10	(1%)	$1	(0%)
Anesthetic gas	50	(0%)	0	(0%)	0	(0%)	$1	(0%)
Total	15,480	(100%)	122	(100%)	730	(100%)	$317	(100%)

Note: See text box for details on calculations Source: NFIRS and NFPA survey

Table 1-B.3. Home Structure Fires Starting With Ignition of Flammable Gas 2007-2011 Annual Averages by Type of Gas

Type of Gas	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Natural gas	5,930	(54%)	30	(28%)	185	(36%)	$73	(41%)
LP-gas	3,110	(28%)	34	(32%)	160	(31%)	$61	(33%)
Unclassified or unknown-type gas	1,780	(16%)	43	(40%)	166	(32%)	$44	(24%)
Acetylene	70	(1%)	0	(0%)	2	(0%)	$2	(1%)
Anesthetic gas	30	(0%)	0	(0%)	6	(1%)	$0	(0%)
Hydrogen	30	(0%)	0	(0%)	0	(0%)	$1	(0%)
Total	10,950	(100%)	108	(100%)	521	(100%)	$181	(100%)

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

Table 1-B.4. Non-Home Structure Fires Starting With Ignition of Flammable Gas 2007-2011 Annual Averages by Type of Gas

Type of Gas	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Natural gas	2,150	(47%)	2	(17%)	41	(20%)	$45	(33%)
Unclassified or unknown-type gas	1,130	(25%)	2	(16%)	85	(40%)	$59	(43%)
LP-gas	1,090	(24%)	8	(57%)	76	(36%)	$29	(21%)
Acetylene	130	(3%)	0	(0%)	3	(2%)	$2	(1%)
Hydrogen	20	(0%)	1	(10%)	4	(2%)	$1	(1%)
Anesthetic gas	10	(0%)	0	(0%)	0	(0%)	$0	(0%)
Total	4,350	(100%)	14	(100%)	210	(100%)	$136	(100%)

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

In 2009, more homes used natural gas (69.2 million housing units) than LP-gas (48.9 million housing units).
These figures include use of outdoor grills, which means risk should be calculated using total home fires, including structure, vehicle and outdoor and others. (See Table 1-C.)

Table 1-C. Home Fires Starting with Ignition of Natural or LP-Gas
2007-2011 Annual Averages

Incident Type	Natural gas				LP-gas			
	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)
Structure	5,930	30	185	$73	3,110	34	160	$61
Vehicle	20	1	2	$0	70	0	6	$1
Outdoor or other fire	1,950	0	7	$1	4,440	0	24	$1
Total	7,900	31	194	$75	7,620	34	190	$62

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

Table 1-D. Homes Using Natural or LP-Gas, by Type of Use

	Millions of Housing Units Using	
	Natural gas	LP-gas
Heating	57.2	8.0
Main	55.6	5.6
Central warm-air furnace	44.3	3.9
Other (including steam or hot water system, built-in room heater, floor or wall pipeless system)	11.3	1.7
Secondary	7.2	2.8
Fireplace	4.8	1.5
Other (including central warm-air furnace)	2.5	1.4
Water heating	58.4	4.2
Cooking	39.2	5.7
Other (e.g., outdoor grill, clothes dryer)	21.5	43.9
Clothes dryer	17.4	1.0
Total	69.2	48.9

Source: Table HC1.1, "Fuels Used and End Uses in U.S. Homes, by Housing Unit Type, 2009," and Table HC3.1, "Appliances in U.S. Homes, by Housing Unit Type, 2009," *2009 Residential Energy Consumption Survey*, http://www.eia.gov/consumption/residential/data/2009/#undefined.

LP-gas has a much larger share of its home fires outdoors, which is understandable because grill users constitute a much larger share of total LP-gas users than natural gas users. (See Table 1-D.)

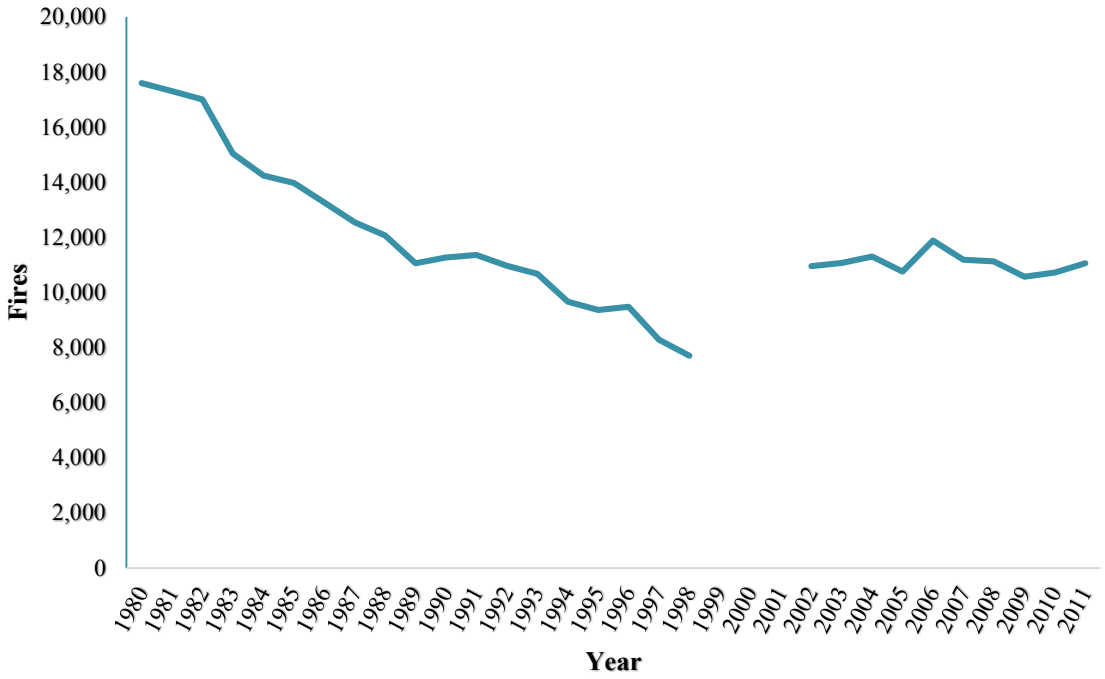
The ratio of natural gas user homes to LP-gas user homes (1.4-to-1) implied by Table 1-D is higher than the ratios for home fires and losses implied by Table 1-C, which implies a higher combined risk for LP-gas. However, the uses are so different for the two gases that it may reflect differences in risk between central warm-air heating equipment (the principal use for natural gas) and outdoor gas grills (the principal use for LP-gas) more than inherent differences in risk between the two types of gas.

A. Homes

Flammable gas home structure fires declined substantially from 1980 to 1998 but have shown a level trend in recent years.

Table 1-1 and Figure 1-1 show the trends in home fires starting with ignition of flammable gases, from 1980 to 2011. Fires dropped by more than half from 1980 to 1998, then jumped to the levels of the early 1990s when NFIRS Version 5.0 was introduced. More recently, the trend has been mostly level.

Figure 1-1: Home Structure Fires Starting With Ignition of Flammable Gas



Note: See Note on Table 1-1.

Source: NFIRS and NFPA survey.

Most home structure fires starting with ignition of a flammable gas involve cooking or heating equipment as the heat source.
Table 1-2 shows that three of the four leading heat sources, accounting for half the fires, involve equipment. Table 1-3 shows that cooking and heating equipment are the types of equipment involved for most home flammable gas fires when equipment is involved. Because these are structure fires, they do not reflect the large role of gas grills in outdoor home fires starting with flammable gas. Washers and dryers, with 2% of home flammable gas structure fires, had the largest equipment share for any equipment other than cooking and heating equipment.

Note that when equipment ignites gas, the gas ignited may not have been fueling the equipment that ignited the gas. In fact, pilot lights for equipment that is not turned on can serve as a heat source for gas leaking from anywhere near the pilot light, as can hot surfaces from any operating equipment near the released gas.

One fifth (22%) of home structure fires starting with ignition of a flammable gas involved a leak or break as a factor contributing to ignition.
Table 1-4 shows the leading factors contributing to ignition, most of which are consistent with equipment as the heat source. Some of the leading factors point to behaviors that could be made safer, including insufficient separation between heat source and combustible, and leaving equipment (such as cooking equipment) unattended. Intentional fires accounted for 6% of home flammable gas structure fires.

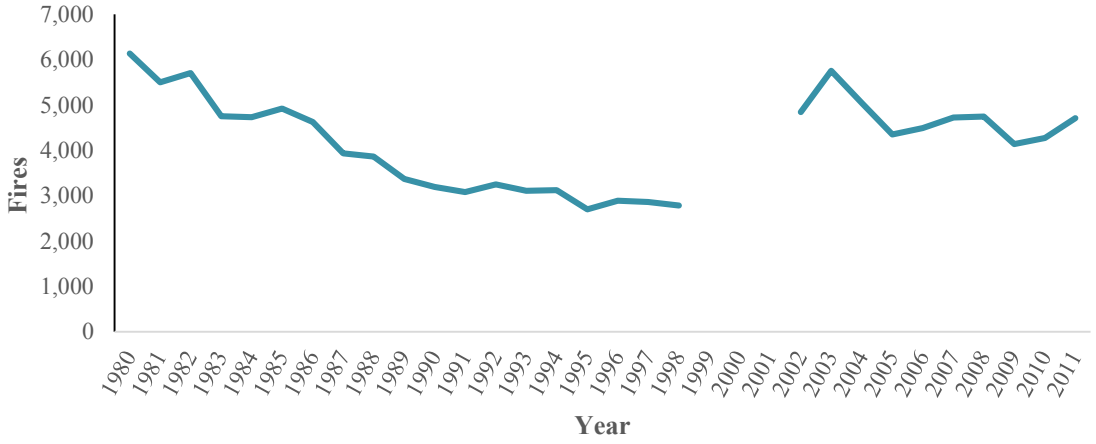
Two out of five (39%) home structure fires starting with ignition of a flammable gas began in the kitchen.
This is consistent with the large role of cooking equipment as heat sources in these fires. Table 1-5 shows the leading areas of origin. The second leading area is heating equipment room or area, which is consistent with the large role of heating equipment as a heat source second only to cooking equipment.

B. Properties Other Than Homes

Three out of five (62%) non-home structure fires starting with ignition of a flammable gas occur at public assembly (28%), residential (18%), or store or office (16%) properties.
Many of these places feature commercial cooking as an activity, which makes it possible that the significant role of cooking equipment as heat sources for home flammable gas fires may be repeated in non-home properties. Table 1-6 shows the shares of these fires by major property use group.

Flammable gas non-home structure fires declined substantially from 1980 to 1998 but have shown a level trend in recent years.
Table 1-7 and Figure 1-2 show the trends in non-home fires starting with ignition of flammable gases, from 1980 to 2011. Fires dropped by more than half from 1980 to 1998, then jumped to the levels of the early 1980s when NFIRS Version 5.0 was introduced. More recently, the trend has been roughly level.

Figure 1-2. Non-Home Structure Fires Starting With Ignition of Flammable Gas



Note: See Note on Table 1-4.

Source: NFIRS and NFPA survey.

Most non-home structure fires starting with ignition of a flammable gas involve cooking or heating equipment as the heat source.
Table 1-8 shows three of the four leading heat sources, accounting for half the fires, involved equipment. Table 1-9 shows that cooking and heating equipment are the types of equipment involved for most non-home flammable gas fires when equipment is involved. Torches, burners, and soldering equipment, with 4% of non-home flammable gas structure fires, had the largest equipment share for any equipment other than cooking and heating equipment, although the burners cited here may include burners on a stovetop.

Note that when equipment ignites gas, the gas ignited may not have been fueling the equipment that ignited the gas. In fact, pilot lights for equipment that is not turned on can serve as a heat source for gas leaking from anywhere near the pilot light, as can hot surfaces from any operating equipment near the released gas.

One-fourth (28%) of non-home structure fires starting with ignition of a flammable gas involved leak or break as a factor contributing to ignition.
Table 1-10 shows the leading factors contributing to ignition, most of which are consistent with equipment as the heat source. Some of the leading factors point to behaviors that could be made safer, including insufficient separation between heat source and combustible, and spills (or perhaps releases) of flammable liquid or gas. Intentional fires accounted for 9% of non-home flammable gas structure fires.

Two out of five (40%) non-home structure fires starting with ignition of a flammable gas began in a kitchen.
This is consistent with the large role of cooking equipment as heat sources in these fires. Table 1-11 shows the leading areas of origin. The second leading area is heating equipment room or area, which is consistent with the large role of heating equipment as a heat source second only to cooking equipment.

Table 1-1.
Home Structure Fires Starting With Ignition of Flammable Gas, by Year

Year	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions) as Reported	in 2011 Dollars
1980	17,600	136	969	$78	$214
1981	17,310	166	1,159	$75	$186
1982	17,010	129	1,058	$147	$343
1983	15,040	163	1,114	$86	$194
1984	14,240	107	920	$84	$182
1985	13,970	130	994	$117	$243
1986	13,260	172	827	$87	$178
1987	12,540	123	923	$74	$145
1988	12,070	131	877	$100	$190
1989	11,060	85	792	479	$143
1990	11,270	106	812	$101	$174
1991	11,360	95	862	$128	$211
1992	10,970	126	904	$132	$211
1993	10,680	99	890	$108	$168
1994	9,670	61	824	$104	$158
1995	9,360	73	692	$121	$179
1996	9,480	153	660	$125	$179
1997	8,280	89	558	$96	$134
1998	7,700	119	579	$92	$127
1999	11,840	0	749	$116	$157
2000	11,340	187	669	$133	$174
2001	10,800	56	792	$139	$177
2002	10,950	46	659	$153	$191
2003	11,070	165	605	$166	$203
2004	11,300	126	636	$119	$142
2005	10,760	116	556	$156	$179
2006	11,880	99	493	$137	$153
2007	11,190	118	561	$226	$245
2008	11,130	80	418	$181	$189
2009	10,570	107	454	$181	$189
2010	10,720	94	519	$154	$159
2011	11,060	139	642	$165	$165

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. Separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Heat Source reported as unknown or blank. Estimates for smoking material, match, lighter, candle, and other open flame sources include proportional shares of fires reported with Heat Source as "other" heat from open flame or smoking materials.

Source: NFIRS and NFPA survey. Inflation adjustments based on consumer price index.

Table 1-2. Home Structure Fires Starting With Ignition of Flammable Gas, 2007-2011 Annual Average, by Heat Source

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Spark, ember or flame from operating equipment	2,940	(27%)	28	(26%)	140	(27%)	$41	(22%)
Unclassified heat from powered equipment	1,540	(14%)	7	(6%)	41	(8%)	$13	(7%)
Unclassified heat source	1,250	(11%)	11	(10%)	37	(7%)	$16	(9%)
Radiated or conducted heat from operating equipment	1,030	(9%)	2	(2%)	30	(6%)	$9	(5%)
Flame or torch used for lighting	690	(6%)	6	(6%)	26	(5%)	$10	(5%)
Heat from direct flame or convection currents	620	(6%)	1	(1%)	13	(2%)	$7	(4%)
Match	550	(5%)	9	(9%)	42	(8%)	$11	(6%)
Cigarette lighter	410	(4%)	11	(10%)	61	(12%)	$19	(11%)
Arcing	310	(3%)	3	(2%)	31	(6%)	$8	(4%)
Unclassified hot or smoldering object	300	(3%)	2	(1%)	7	(1%)	$3	(2%)
Lightning	210	(2%)	0	(0%)	2	(0%)	$10	(6%)
Smoking material	160	(1%)	11	(11%)	43	(8%)	$7	(4%)
Hot ember or ash	150	(1%)	1	(1%)	4	(1%)	$1	(1%)
Unclassified heat spread from another fire	100	(1%)	1	(1%)	0	(0%)	$3	(2%)
Incendiary device	100	(1%)	4	(4%)	1	(0%)	$3	(2%)
Heat or spark from friction	80	(1%)	1	(1%)	6	(1%)	$2	(1%)
Candle	80	(1%)	2	(2%)	8	(2%)	$2	(1%)
Unclassified chemical or natural heat source	70	(1%)	1	(1%)	3	(1%)	$3	(1%)
Multiple heat sources	70	(1%)	5	(5%)	1	(0%)	$3	(2%)
Conducted heat from another fire	60	(1%)	0	(0%)	5	(1%)	$1	(0%)
Radiated heat from another fire	60	(1%)	0	(0%)	1	(0%)	$1	(0%)
Other known heat source	150	(1%)	1	(1%)	17	(3%)	$9	(5%)
Total	10,950	(100%)	108	(100%)	521	(100%)	$181	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Heat Source reported as unknown or blank. Estimates for smoking material, metal, lighter, candle, and other open flame sources include proportional shares of fires reported with Heat Source as "other" heat from open flame or smoking materials. Source: NFIRS and NFPA survey.

Table 1-3. Home Structure Fires Starting With Ignition of Flammable Gas, 2007-2011 Annual Averages, by Equipment Involved in Ignition

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Range with or without oven	2,300	(21%)	14	(13%)	48	(9%)	$9	(5%)
Grill, hibachi, or barbecue	2,050	(19%)	4	(4%)	50	(10%)	$18	(10%)
No equipment involved	1,420	(13%)	22	(21%)	108	(21%)	$78	(43%)
Portable or stationary space heater	1,390	(13%)	23	(21%)	69	(13%)	$16	(9%)
Water heater	1,040	(10%)	8	(7%)	84	(16%)	$19	(11%)
Central heating unit	800	(7%)	19	(17%)	34	(7%)	$12	(7%)
Oven or rotisserie	770	(7%)	0	(0%)	22	(4%)	$1	(1%)
Washer or dryer	220	(2%)	0	(0%)	8	(2%)	$5	(3%)
Unclassified equipment	200	(2%)	4	(3%)	10	(2%)	$5	(3%)
Fireplace, chimney or connector	120	(1%)	0	(0%)	19	(4%)	$2	(1%)
Torch, burner or soldering equipment	90	(1%)	0	(0%)	6	(1%)	$4	(2%)
Portable cooking or warming device	60	(1%)	0	(0%)	1	(0%)	$0	(0%)
Other known equipment*	490	(4%)	14	(13%)	62	(12%)	$12	(7%)
Total	10,950	(100%)	108	(100%)	521	(100%)	$181	(100%)

* Leading equipment for deaths not shown above are gas regulator (4% of deaths), oxygen administration equipment (4%), power drill or screwdriver (3%), and wiring or related equipment (3%).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Equipment Involved in Ignition reported as unknown or blank. Reports of no equipment involved are treated as unknown equipment unless Heat Source is coded as 40-99, indicating a known non-equipment Heat Source. Also, equipment reported with a code ending in two zeros is treated as a partial unknown and proportionally allocated (e.g., unclassified or unknown type cooking equipment).

Source: NFIRS and NFPA survey.

Table 1-4. Home Structure Fires Starting With Ignition of Flammable Gas, 2007-2011 Annual Averages, by Factor Contributing to Ignition

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Leak or break	2,440	(22%)	23	(22%)	111	(21%)	$51	(28%)
Unclassified mechanical failure or malfunction	1,710	(16%)	6	(5%)	43	(8%)	$16	(9%)
Heat source too close to combustibles	1,120	(10%)	14	(13%)	71	(14%)	$17	(9%)
Unclassified misuse of material	700	(6%)	24	(22%)	61	(12%)	$18	(10%)
Equipment unattended	540	(5%)	2	(2%)	15	(3%)	$4	(2%)
Unclassified factor contributed to ignition	520	(5%)	11	(10%)	27	(5%)	$18	(10%)
Worn out	420	(4%)	0	(0%)	9	(2%)	$2	(1%)
Abandoned or discarded material	420	(4%)	2	(2%)	1	(0%)	$2	(1%)
Flammable liquid or gas spilled	360	(3%)	17	(16%)	44	(8%)	$14	(8%)
Failure to clean	320	(3%)	0	(0%)	4	(1%)	$1	(1%)
Automatic control failure	300	(3%)	2	(2%)	8	(2%)	$1	(0%)
Unintentionally turned on or not turned off	240	(2%)	1	(1%)	17	(3%)	$3	(2%)
Storm	210	(2%)	0	(0%)	2	(0%)	$8	(5%)
Installation deficiency	190	(2%)	4	(4%)	6	(1%)	$3	(2%)
Outside or open fire for warming or cooking	150	(1%)	0	(0%)	1	(0%)	$1	(1%)
Equipment not being operated properly	140	(1%)	0	(0%)	11	(2%)	$1	(1%)
Improper startup	140	(1%)	1	(1%)	33	(6%)	$1	(1%)
Unclassified electrical failure or malfunction	140	(1%)	1	(1%)	1	(0%)	$2	(1%)
Flammable liquid used to kindle fire	130	(1%)	2	(2%)	10	(2%)	$5	(3%)
Unclassified operational deficiency	130	(1%)	0	(0%)	12	(2%)	$4	(2%)
Improper fueling technique	110	(1%)	1	(1%)	8	(2%)	$2	(1%)
Manual control failure	100	(1%)	0	(0%)	4	(1%)	$1	(0%)
Improper container or storage	80	(1%)	0	(0%)	5	(1%)	$2	(1%)
Unclassified fire spread or control	70	(1%)	4	(4%)	2	(0%)	$2	(1%)
Unspecified short circuit arc	70	(1%)	0	(0%)	1	(0%)	$1	(0%)

Table 1-4. Home Structure Fires Starting With Ignition of Flammable Gas, 2007-2011 Annual Averages, by Factor Contributing to Ignition (Continued)

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Arc or spark from operating equipment	70	(1%)	3	(3%)	9	(2%)	$2	(1%)
Cutting or welding too close to combustible	60	(1%)	0	(0%)	3	(1%)	$1	(1%)
Exposure fire	60	(1%)	2	(2%)	7	(1%)	$5	(3%)
Collision, knock down, or turn over	60	(1%)	1	(1%)	5	(1%)	$3	(1%)
Playing with heat source	60	(1%)	0	(0%)	2	(0%)	$1	(0%)
Other known factor	460	(4%)	5	(5%)	23	(4%)	$11	(6%)
Total	10,950	(100%)	108	(100%)	521	(100%)	$181	(100%)
Total factors	11,530	(105%)	126	(117%)	553	(106%)	$201	(111%)
All electrical failures or malfunctions	350	(3%)	4	(4%)	12	(2%)	$6	(4%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Factor Contributing to Ignition reported as none, unknown or blank.

Source: NFIRS and NFPA survey.

Table 1-5. Home Structure Fires Starting With Ignition of Flammable Gas, 2007-2011 Annual Averages, by Area of Origin

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Kitchen	4,310	(39%)	17	(16%)	119	(23%)	$23	(13%)
Heating equipment room	1,090	(10%)	6	(6%)	57	(11%)	$10	(6%)
Courtyard, terrace or patio	610	(6%)	1	(1%)	26	(5%)	$6	(3%)
Exterior balcony or unenclosed porch	470	(4%)	0	(0%)	9	(2%)	$9	(5%)
Unclassified outside area	440	(4%)	2	(2%)	5	(1%)	$11	(6%)
Unclassified area of origin	410	(4%)	4	(4%)	1	(0%)	$3	(2%)
Garage*	320	(3%)	6	(5%)	27	(5%)	$17	(9%)
Laundry room or area	310	(3%)	0	(0%)	21	(4%)	$9	(5%)
Unclassified function area	300	(3%)	6	(5%)	26	(5%)	$8	(4%)
Living room, family room, or den	260	(2%)	12	(11%)	48	(9%)	$9	(5%)
Crawl space or substructure space	240	(2%)	11	(10%)	24	(5%)	$10	(5%)
Duct for HVAC, cable, heating, or air conditioning	210	(2%)	1	(1%)	3	(1%)	$1	(1%)
Bedroom	170	(2%)	17	(15%)	44	(8%)	$7	(4%)
Exterior wall surface	170	(2%)	0	(0%)	1	(0%)	$6	(3%)
Unclassified structural area	140	(1%)	14	(13%)	15	(3%)	$7	(4%)
Unclassified equipment or service area	100	(1%)	0	(0%)	5	(1%)	$3	(2%)
Bathroom	100	(1%)	1	(1%)	15	(3%)	$2	(1%)
Wall assembly or concealed space	90	(1%)	3	(3%)	2	(0%)	$8	(4%)
Fuel tank or fuel line of vehicle	90	(1%)	0	(0%)	4	(1%)	$1	(0%)
Attic or ceiling/roof assembly or concealed space	90	(1%)	0	(0%)	3	(1%)	$6	(4%)
Closet	80	(1%)	0	(0%)	7	(1%)	$1	(1%)
Unclassified means of egress	80	(1%)	1	(1%)	4	(1%)	$1	(0%)
Unclassified storage area	70	(1%)	0	(0%)	4	(1%)	$2	(1%)
Hallway or corridor	70	(1%)	0	(0%)	10	(2%)	$1	(0%)
Lobby or entrance way	70	(1%)	1	(1%)	2	(0%)	$1	(1%)
Conduit, pipe, utility, or ventilation shaft	60	(1%)	0	(0%)	0	(0%)	$1	(0%)
Exterior stairway or fire escape	60	(1%)	0	(0%)	1	(0%)	$1	(1%)

Table 1-5. Home Structure Fires Starting With Ignition of Flammable Gas, 2007-2011 Annual Averages, by Area of Origin (Continued)

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Other known area of origin	510	(5%)	7	(6%)	35	(7%)	$18	(10%)
Total	10,950	(100%)	108	(100%)	521	(100%)	$181	(100%)

* Does not include residential garage coded as separate property.

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material fires ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Area of Origin reported as unknown or blank.

Source: NFIRS and NFPA survey.

Table 1-6. Non-Home Structure Fires Starting With Ignition of Flammable Gas, 2007-2011 Annual Averages, by Major Property Use Group

Property Use Group	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Public assembly	1,270	(28%)	0	(0%)	34	(16%)	$18	(13%)
Residential	830	(18%)	3	(19%)	34	(16%)	$10	(7%)
Stores and offices	710	(16%)	4	(30%)	39	(19%)	$20	(15%)
Outside or special property	490	(11%)	1	(5%)	27	(13%)	$3	(2%)
Storage	400	(9%)	3	(19%)	31	(15%)	$20	(15%)
Educational	180	(4%)	0	(0%)	10	(5%)	$1	(0%)
Manufacturing	180	(4%)	1	(10%)	11	(5%)	$28	(20%)
Health care or correction	140	(3%)	0	(0%)	7	(3%)	$1	(0%)
Industrial, utility, defense, agriculture, or mining	120	(3%)	2	(17%)	12	(6%)	$30	(22%)
Unclassified	70	(2%)	0	(0%)	1	(1%)	$5	(4%)
None or undetermined	120	(3%)	0	(0%)	2	(1%)	$1	(1%)
Total	4,530	(100%)	14	(100%)	210	(100%)	$136	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars.
Source: NFIRS and NFPA survey.

Table 1-7. Non-Home Structure Fires Starting With Flammable Gas, by Year

Year	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions) as Reported	in 2011 Dollars
1980	6,130	18	322	$61	$167
1981	5,500	3	356	$76	$186
1982	5,700	27	439	$65	$152
1983	4,750	16	686	$113	$254
1984	4,730	17	340	$69	$149
1985	4,920	12	309	$71	$148
1986	4,620	16	281	$63	$130
1987	3,930	5	240	$66	$130
1988	3,860	7	348	$53	$100
1989	3,370	27	246	$40	$72
1990	3,190	46	277	$278	$478
1991	3,080	18	186	$131	$216
1992	3,250	7	222	$82	$132
1993	3,110	7	221	$50	$78
1994	3,120	4	230	$71	$108
1995	2,700	19	176	$100	$148
1996	2,890	3	212	$60	$86
1997	2,860	9	192	$85	$119
1998	2,760	3	150	$80	$111
1999	5,930	0	334	$88	$119
2000	4,510	0	397	$50	$65
2001	5,390	0	202	$203	$258
2002	4,840	33	182	$75	$94
2003	5,750	6	213	$73	$90
2004	5,040	39	130	$97	$115
2005	4,350	13	228	$108	$124
2006	4,490	10	195	$49	$54
2007	4,720	19	191	$139	$150
2008	4,740	21	200	$243	$254
2009	4,140	10	232	$71	$74
2010	4,270	3	220	$70	$73
2011	4,710	21	194	$151	$151

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Also, because participation in NFIRS Version 5.0 was low in the early years (1999-2001), those estimates are especially volatile. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars.

Source: NFIRS and NFPA survey. Inflation adjustment based on consumer price index.

Table 1-8. Non-Home Structure Fires Starting With Ignition of Flammable Gas, 2007-2011 Annual Averages, by Heat Source

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Spark, ember or flame from operating equipment	1,330	(29%)	3	(18%)	72	(34%)	$46	(34%)
Unclassified heat from powered equipment	660	(15%)	0	(0%)	16	(8%)	$15	(11%)
Unclassified heat source	450	(10%)	0	(0%)	10	(5%)	$12	(9%)
Radiated or conducted heat from operating equipment	380	(8%)	1	(9%)	14	(7%)	$9	(6%)
Flame or torch used for lighting	370	(8%)	1	(9%)	15	(7%)	$4	(3%)
Match	210	(5%)	4	(31%)	7	(4%)	$2	(1%)
Cigarette lighter	180	(4%)	0	(0%)	33	(16%)	$6	(5%)
Heat from direct flame or convection currents	160	(3%)	1	(10%)	4	(2%)	$2	(1%)
Unclassified hot or smoldering object	160	(3%)	0	(0%)	2	(1%)	$2	(1%)
Arcing	120	(3%)	0	(0%)	6	(3%)	$5	(4%)
Heat or spark from friction	80	(2%)	3	(18%)	8	(4%)	$4	(3%)
Smoking material	50	(1%)	0	(0%)	10	(5%)	$6	(4%)
Unclassified heat spread from another fire	50	(1%)	0	(0%)	0	(0%)	$1	(1%)
Molten or hot material	40	(1%)	0	(0%)	0	(0%)	$3	(2%)
Hot ember or ash	40	(1%)	0	(0%)	1	(0%)	$2	(2%)
Lightning	40	(1%)	0	(0%)	0	(0%)	$5	(4%)
Unclassified chemical or natural heat source	30	(1%)	0	(0%)	0	(0%)	$1	(0%)
Incendiary device	30	(1%)	0	(0%)	0	(0%)	$0	(0%)
Backfire from internal combustion engine	30	(1%)	0	(0%)	1	(0%)	$0	(0%)
Multiple heat sources	30	(1%)	0	(0%)	0	(0%)	$5	(4%)
Other known heat source*	100	(2%)	1	(6%)	10	(5%)	$4	(3%)
Total	4,530	(100%)	14	(100%)	210	(100%)	$136	(100%)

* Leading heat source for deaths not shown above was radiated heat from another fire (6% of deaths).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Heat Source reported as unknown or blank. Estimates for smoking material, match, lighter, candle, and other open flame sources include proportional shares of fires reported with Heat Source as "other" heat from open flame or smoking materials.
Source: NFIRS and NFPA survey.

Table 1-9. Non-Home Structure Fires Starting With Ignition of Flammable Gas, 2007-2011 Annual Averages, by Equipment Involved in Ignition

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Range with or without oven	710	(16%)	0	(0%)	23	(11%)	$6	(4%)
No equipment involved	690	(15%)	6	(40%)	36	(17%)	$14	(11%)
Portable or stationary space heater	520	(11%)	3	(20%)	34	(16%)	$8	(6%)
Deep fryer	510	(11%)	0	(0%)	21	(10%)	$11	(8%)
Grill	430	(9%)	0	(0%)	14	(7%)	$3	(2%)
Central heating unit	330	(7%)	0	(0%)	7	(4%)	$7	(5%)
Water heater	310	(7%)	0	(0%)	14	(7%)	$2	(2%)
Torch, burner or soldering equipment	190	(4%)	0	(0%)	12	(6%)	$15	(11%)
Oven or rotisserie	160	(4%)	6	(40%)	9	(4%)	$4	(3%)
Unclassified equipment involved in ignition	100	(2%)	0	(0%)	3	(1%)	$3	(2%)
Portable cooking or warming device	70	(2%)	0	(0%)	11	(5%)	$1	(1%)
Yard equipment including snow blower	40	(1%)	0	(0%)	3	(2%)	$5	(4%)
Commercial or medical equipment	40	(1%)	0	(0%)	4	(2%)	$13	(10%)
Washer or dryer	40	(1%)	0	(0%)	0	(0%)	$0	(0%)
Lamp, light fixture or light bulb	30	(1%)	0	(0%)	4	(2%)	$0	(0%)
Fireplace, chimney or connector	30	(1%)	0	(0%)	0	(0%)	$1	(0%)
Unclassified portable appliance designed to produce heat	30	(1%)	0	(0%)	0	(0%)	$1	(1%)
Other known equipment	300	(7%)	0	(0%)	14	(7%)	$42	(31%)
Total	4,530	(100%)	14	(100%)	210	(100%)	$136	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material fires ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Equipment Involved in Ignition reported as unknown or blank. Reports of no equipment involved are treated as unknown equipment unless Heat Source is coded as 40-99, indicating a known non-equipment Heat Source. Also, equipment reported with a code ending in two zeros is treated as a partial unknown and proportionally allocated (e.g., unclassified or unknown type cooking equipment).

Source: NFIRS and NFPA survey.

Table 1-10. Non-Home Structure Fires Starting With Ignition of Flammable Gas, 2007-2011 Annual Averages, by Factor Contributing to Ignition

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Leak or break	1,250	(28%)	5	(37%)	46	(22%)	$31	(23%)
Unclassified mechanical failure or malfunction	690	(15%)	2	(11%)	17	(8%)	$20	(15%)
Heat source too close to combustibles	310	(7%)	2	(11%)	23	(11%)	$10	(7%)
Unclassified misuse of material or product	250	(6%)	3	(19%)	33	(16%)	$5	(4%)
Flammable liquid or gas spilled	210	(5%)	3	(24%)	21	(10%)	$15	(11%)
Unclassified factor contributed to ignition	200	(4%)	1	(9%)	14	(7%)	$7	(5%)
Abandoned or discarded material	170	(4%)	0	(0%)	3	(2%)	$0	(0%)
Worn out	160	(3%)	2	(15%)	4	(2%)	$0	(0%)
Automatic control failure	150	(3%)	0	(0%)	3	(2%)	$1	(1%)
Unclassified operational deficiency	140	(3%)	0	(0%)	3	(1%)	$2	(1%)
Failure to clean	130	(3%)	0	(0%)	1	(1%)	$0	(0%)
Manual control failure	90	(2%)	0	(0%)	1	(0%)	$0	(0%)
Cutting or welding too close to combustible	90	(2%)	0	(0%)	4	(2%)	$2	(1%)
Unintentionally turned on or not turned off	90	(2%)	0	(0%)	8	(4%)	$15	(11%)
Equipment unattended	80	(2%)	0	(0%)	1	(1%)	$2	(1%)
Improper startup	80	(2%)	0	(0%)	12	(6%)	$0	(0%)
Equipment not being operated properly	70	(2%)	1	(8%)	7	(3%)	$0	(0%)
Flammable liquid used to kindle fire	60	(1%)	0	(0%)	1	(0%)	$2	(1%)
Collision, knock down, or turn over	50	(1%)	0	(0%)	2	(1%)	$13	(9%)
Unclassified electrical failure or malfunction	50	(1%)	0	(0%)	0	(0%)	$4	(3%)
Playing with heat source	50	(1%)	0	(0%)	3	(2%)	$1	(0%)
Unclassified fire spread or control	50	(1%)	0	(0%)	1	(0%)	$1	(1%)
Improper container or storage	50	(1%)	0	(0%)	3	(1%)	$0	(0%)
Arc or spark from operating equipment	40	(1%)	0	(0%)	1	(1%)	$3	(2%)

Table 1-10. Non-Home Structure Fires Starting With Ignition of Flammable Gas, 2007-2011 Annual Averages, by Factor Contributing to Ignition (Continued)

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Storm	30	(1%)	0	(0%)	0	(0%)	$3	(2%)
Exposure fire	30	(1%)	1	(8%)	1	(0%)	$2	(1%)
Improper fueling technique	30	(1%)	0	(0%)	3	(1%)	$0	(0%)
Installation deficiency	30	(1%)	0	(0%)	6	(3%)	$2	(1%)
Backfire	30	(1%)	0	(0%)	2	(1%)	$1	(1%)
Unspecified short circuit arc	30	(1%)	0	(0%)	6	(3%)	$0	(0%)
Short circuit arc from defective or worn insulation	20	(1%)	0	(0%)	1	(0%)	$1	(1%)
Other known factor	130	(3%)	0	(0%)	10	(5%)	$10	(7%)
Total	4,530	(100%)	14	(100%)	210	(100%)	$136	(100%)
Total factors	4,850	(107%)	20	(141%)	239	(114%)	$155	(114%)
All electrical failures or malfunctions	150	(3%)	1	(4%)	4	(2%)	$6	(4%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Factor Contributing to Ignition reported as none, unknown, or blank.

Source: NFIRS and NFPA survey.

Table 1-11. Non-Home Structure Fires Starting With Ignition of Flammable Gas, 2007-2011 Annual Averages, by Area of Origin

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Kitchen	1,790	(40%)	3	(19%)	56	(27%)	$9	(6%)
Heating equipment room	320	(7%)	0	(0%)	6	(3%)	$3	(2%)
Unclassified outside area	230	(5%)	0	(0%)	5	(3%)	$0	(0%)
Garage*	170	(4%)	0	(0%)	15	(7%)	$8	(6%)
Unclassified equipment or service area	150	(3%)	0	(0%)	9	(4%)	$5	(4%)
Unclassified area of origin	110	(3%)	1	(4%)	3	(1%)	$4	(3%)
Unclassified storage area	100	(2%)	1	(4%)	7	(3%)	$8	(6%)
Processing or manufacturing area or workroom	90	(2%)	2	(15%)	20	(10%)	$35	(25%)
Unclassified function area	90	(2%)	0	(0%)	7	(3%)	$3	(2%)
Maintenance or paint shop or area	90	(2%)	0	(0%)	10	(5%)	$6	(5%)
Courtyard, terrace or patio	80	(2%)	0	(0%)	3	(1%)	$0	(0%)
Unclassified structural area	60	(1%)	1	(7%)	1	(0%)	$2	(1%)
Storage room, area, tank, or bin	60	(1%)	0	(0%)	3	(1%)	$2	(1%)
Laundry room or area	60	(1%)	0	(0%)	2	(1%)	$0	(0%)
Duct for HVAC, cable, exhaust, heating, or air conditioning	50	(1%)	0	(0%)	0	(0%)	$1	(0%)
Storage of supplies or tools	50	(1%)	1	(6%)	3	(2%)	$1	(1%)
Lawn, field or open area	50	(1%)	0	(0%)	6	(3%)	$0	(0%)
Fuel tank or fuel line of vehicle	50	(1%)	0	(0%)	4	(2%)	$1	(1%)
Lobby or entrance way	50	(1%)	0	(0%)	1	(0%)	$2	(1%)
Unclassified vehicle area	40	(1%)	0	(0%)	2	(1%)	$1	(1%)
Conduit, pipe, utility, or ventilation shaft	40	(1%)	0	(0%)	0	(0%)	$5	(4%)
Incinerator room or area	40	(1%)	2	(11%)	1	(0%)	$0	(0%)
Machinery room or area	40	(1%)	0	(0%)	3	(1%)	$2	(2%)
Exterior roof surface	40	(1%)	0	(0%)	0	(0%)	$0	(0%)
Exterior balcony or unenclosed porch	40	(1%)	0	(0%)	0	(0%)	$1	(0%)

Table 1-11. Non-Home Structure Fires Starting With Ignition of Flammable Gas, 2007-2011 Annual Averages, by Area of Origin (Continued)

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Exterior wall surface	30	(1%)	0	(0%)	1	(1%)	$1	(1%)
Unclassified service facility	30	(1%)	0	(0%)	3	(1%)	$2	(1%)
Living room, family room, lounge or den	30	(1%)	0	(0%)	5	(3%)	$0	(0%)
Engine area, running gear or wheel area of vehicle	30	(1%)	0	(0%)	2	(1%)	$1	(0%)
Shipping, receiving or loading area	30	(1%)	1	(10%)	3	(2%)	$9	(7%)
Laboratory	30	(1%)	0	(0%)	3	(1%)	$1	(1%)
Crawl space or substructure space	30	(1%)	0	(0%)	1	(0%)	$1	(0%)
Bedroom	30	(1%)	1	(7%)	3	(2%)	$0	(0%)
Bathroom, locker room or check room	30	(1%)	0	(0%)	4	(2%)	$2	(2%)
Closet	30	(1%)	0	(0%)	0	(0%)	$1	(1%)
Wall assembly or concealed space	20	(1%)	0	(0%)	0	(0%)	$1	(0%)
Hallway, corridor, or mall	20	(1%)	0	(0%)	1	(0%)	$0	(0%)
Office	20	(1%)	0	(0%)	2	(1%)	$1	(0%)
Other known area of origin**	270	(6%)	3	(18%)	18	(9%)	$19	(14%)
Total	4,530	(100%)	14	(100%)	210	(100%)	$136	(100%)

* May not include or be limited to garages coded as property use.

** Leading area for deaths not shown above is passenger area of vehicle (18% of deaths).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Area of Origin reported as unknown or blank.

Source: NFIRS and NFPA survey. Infection adjustments based on consumer price index.

During 2007-2011, an average of 13,730 fires per year were reported as having begun with the ignition of natural gas as the type of material first ignited.
These fires caused an average of 35 civilian deaths per year, 254 civilian injuries per year, and $303 million in direct property damage per year.

Tables 2-A.1, 2-A.2, and 2-4.3 show how these fires divide, first into fires at homes versus any other property use, and within those two groups, into structure, vehicle, and outdoor or other fires. Nearly all home losses are in structure fires, but one-quarter of the fires are not in structure fires.

Table 2-A.1. Fires Starting With Ignition of Natural Gas
2007-2011 Annual Averages, by Property Use

Property Use	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Home	7,900	(58%)	31	(89%)	194	(76%)	$75	(25%)
Non-home	5,830	(42%)	4	(11%)	60	(24%)	$228	(75%)
Total	13,730	(100%)	35	(100%)	254	(100%)	$303	(100%)

Note: See text box on p. 26 for details on calculations. Source: NFIRS and NFPA survey.

Table 2-A.2. Home Fires Starting With Ignition of Natural Gas
2007-2011 Annual Averages, by Incident Type

Incident Type	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Structure fire	5,930	(75%)	30	(98%)	185	(96%)	$73	(98%)
Vehicle fire	20	(0%)	1	(2%)	2	(1%)	$0	(1%)
Outdoor or other fire	1,950	(25%)	0	(0%)	7	(3%)	$1	(1%)
Total	7,900	(100%)	31	(100%)	194	(100%)	$75	(100%)

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

Table 2-A.3. Non-Home Fires Starting With Ignition of Natural Gas
2007-2011 Annual Averages, by Incident Type

Incident Type	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Structure fire	2,150	(37%)	2	(59%)	41	(69%)	$45	(20%)
Vehicle fire	150	(3%)	0	(0%)	3	(6%)	$7	(3%)
Outdoor or other fire	3,530	(61%)	2	(41%)	15	(25%)	$176	(77%)
Total	5,830	(100%)	4	(100%)	60	(100%)	$228	(100%)

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

Data Sources, Definitions and Conventions Used in This Section

Unless otherwise specified, the statistics in this analysis are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to federal or state agencies or industrial fire brigades. These estimates are projections based on the detailed information collected in Version 5.0 of the U.S. Fire Administration's National Fire Incident Reporting System (NFIRS 5.0) and the National Fire Protection Association's (NFPA's) annual fire department experience survey. In general, any fire that occurs in or on a structure is considered a structure fire, even if the fire was limited to contents and the building itself was not damaged.

"Home" includes one- and two-family homes, manufactured homes, and multi-family housing, including departments.

Flammable gases are identified in NFIRS 5.0 Type of Material First Ignited:

10 - Unclassified or unknown type flammable gas, including benzene, benzol, carbon disulfide, carbon monoxide, ethylene, ethylene oxide, and vinyl chloride. Corresponds to codes 10 (unknown and 19 (unclassified) in earlier version of NFIRS and may include Codes 13 (manufactured gas) and 17 (specialty gas other than anesthetic) in earlier versions of NFIRS.
11 – Natural gas, including methane and swamp gas.
12 – LP-gas, including butane, propane, and butane-air mixture, which was coded separately as LP-City gas in earlier versions of NFIRS.
13 – Anesthetic gas, which was code 15 in earlier versions of NFIRS.
14 – Acetylene gas, which was code 16 in earlier versions of NFIRS.
15 – Hydrogen, which was not separately identified in earlier version of NFIRS.

NFIRS 5.0 includes a category of structure fires collectively referred to as "confined fires," identified by incident type. These include confined cooking fires, confined chimney or flue fires, confined trash fires, confined fuel burner or boiler fires, confined commercial compactor fires, and confined incinerator fires (incident type 113-118). Losses are generally minimal in these fires, which by definition, are assumed to have been limited to the object of origin. Although detailed data is not required for these fires, it is sometimes present.

Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Property damage has not been adjusted for inflation. Fires are rounded to the nearest ten, civilian deaths and injuries to the nearest one, and direct property damage to the nearest million. Additional details on the methodology may be found in Appendix A.

Reporting of Type of Material First Ignited is not required if Item First Ignited is coded in the range of 70 to 99. As with confined fires, the field is nevertheless reported for many fires, but the percentage of unknowns and blanks is higher. Fires are analyzed separately for (1) non-confined structure fires, (2) confined structure fires, (3) vehicle fires, (4) outdoor or other vegetation fires, and (5) outdoor or other non-vegetation fires (principally trash). For each of these, fires are analyzed separately for Item First Ignited 70-99 and Item First Ignited not 70-99.

In 2009, more homes used natural gas (69.2 million housing units) than LP-gas (48.9 million housing units).
These figures include use of outdoor grills, which means risk should be calculated using total home fires, including structure, vehicle and outdoor and other. (See Table 2-B.)

Table 2-B. Home Fires Starting with Ignition of Natural or LP-Gas 2007-2011 Annual Averages, by Incident Type

	Natural gas				LP gas			
Incident Type	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)
Structure	5,930	30	185	$73	3,110	34	160	$61
Vehicle	20	1	2	$0	70	0	6	$1
Outdoor or other	1,950	0	7	$1	4,440	0	24	$1
Total	7,900	31	194	$75	7,620	34	190	$62

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

LP-gas has a much larger share of its home fires outdoors, which is understandable because grill users constitute a much larger share of total LP-gas users than natural gas users. (See Table 2-C.)

Table 2-C. Homes Using Natural or LP-Gas, by Type of Use

	Millions of Housing Units Using	
	Natural gas	LP-gas
Heating	57.2	8.0
Main	55.6	5.6
Central warm-air furnace	44.3	3.9
Other (including steam or hot water system, built-in room heater, floor or wall pipeless system)	11.3	1.7
Secondary	7.2	2.8
Fireplace	4.8	1.5
Other (including central warm-air furnace)	2.5	1.4
Water heating	58.4	4.2
Cooking	39.2	5.7
Other (e.g., outdoor grill, clothes dryer)	21.5	43.9
Clothes dryer	17.4	1.0
Total	69.2	48.9

Source: Table HC1.1, "Fuels Used and End Uses in U.S. Homes, by Housing Unit Type, 2009," and Table HC3.1, "Appliances in U.S. Homes, by Housing Unit Type, 2009," *2009 Residential Energy Consumption Survey*, http://www.eia.gov/consumption/residential/data/2009/#undefined.

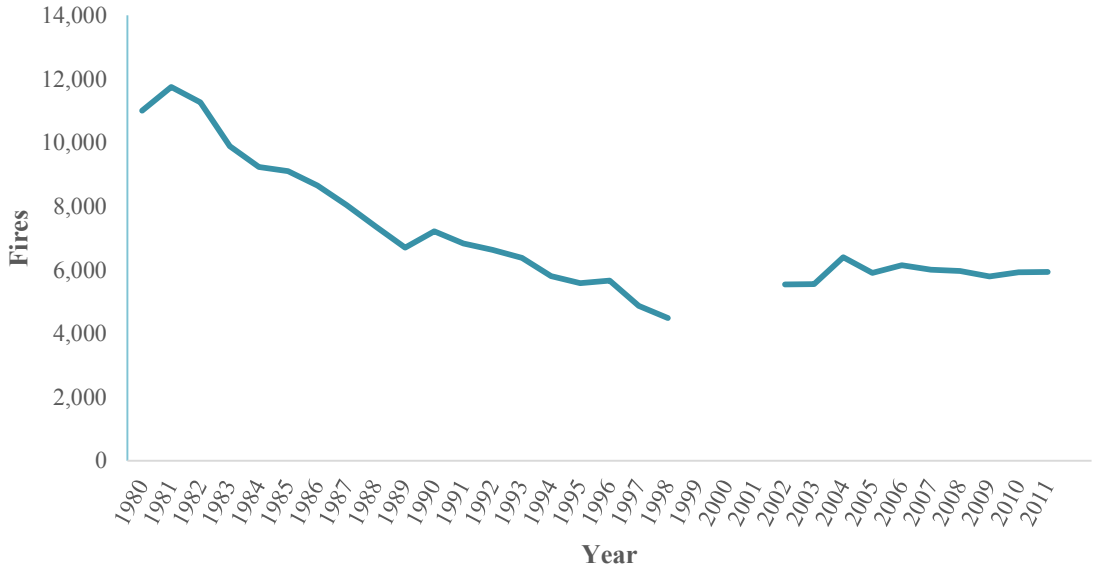
The ratio of natural gas user homes to LP-gas user homes (1.4-to-1) implied by Table 2-C is higher than the ratios for home fires and losses implied by Table 3-B, which implies a higher combined risk for LP-gas. However, the uses are so different for the two gases that it may reflect differences in risk between central warm-air heating equipment (the principal use for natural gas) and outdoor gas grills (the principal use for LP-gas) more than inherent differences in risk between the two types of gas.

A. Homes

Natural gas home structure fires declined substantially from 1980 to 1998 but have shown a level trend in recent years.

Table 2-1 and Figure 2-1 show the trends in home fires starting with ignition of natural gas, from 1980 to 2011. Fires dropped by more than half from 1980 to 1998, then jumped to the levels of the mid-1990s when NFIRS Version 5.0 was introduced. More recently, the trend has been mostly level.

Figure 2-1: Home Structure Fires Starting With Ignition of Natural Gas



Note: See Note on Table 2-1. Source: NFIRS and NPA survey.

Most home structure fires starting with ignition of natural gas involve cooking or heating equipment as the heat source.

Table 2-2 shows that the three leading heat sources, accounting for more than half the fires, involve equipment. Table 2-3 shows that cooking and heating equipment are the types of equipment involved for most home natural gas fires when equipment is involved. Washers and dryers, with 3% of home natural gas structure fires, had the largest equipment share for any equipment other than cooking and heating equipment.

Note that when equipment ignites gas, the gas ignited may not have been fueling the equipment that ignited the gas. In fact, pilot lights for equipment that is not turned on can serve as a heat

source for gas leaking from anywhere near the pilot light, as can hot surfaces from any operating equipment near the released gas.

One fifth (21%) of home structure fires starting with ignition of natural gas involved leak or break as a factor contributing to ignition.
Table 2-4 shows the leading factors contributing to ignition, most of which are consistent with equipment as the heat source. Some of the leading factors point to behaviors that could be made safer, including insufficient separation between heat source and combustible, and leaving equipment (such as cooking equipment) unattended. Intentional fires accounted for 3% of home natural gas structure fires.

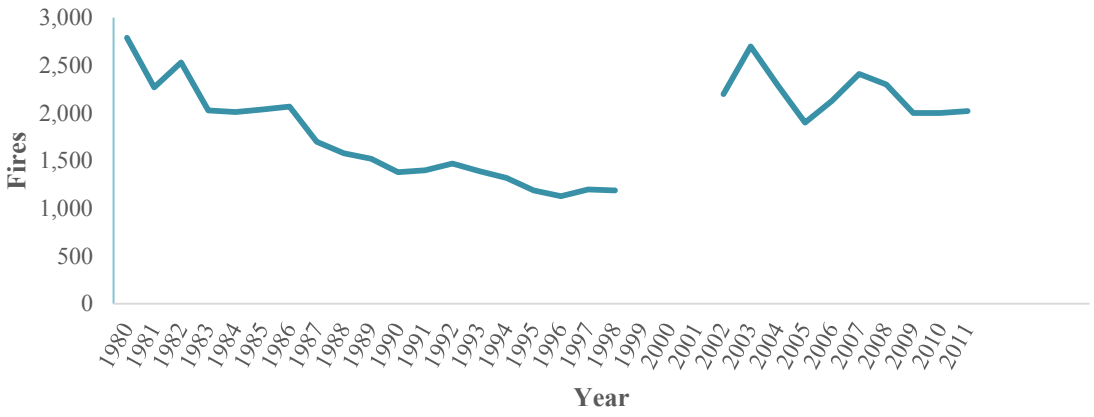
More than half (57%) of home structure fires starting with ignition of natural gas began in the kitchen.
This is consistent with the large role of cooking equipment as heat sources in these fires. Table 2-5 shows the leading areas of origin. The second leading area (14%) is heating equipment room or area, which is consistent with the large role of heating equipment as a heat source, second only to cooking equipment.

B. Properties Other Than Homes

Three out of four (78%) non-home structure fires starting with ignition of natural gas occur at public assembly (44%), store or office (17%), or residential (17%) properties.
Many of these places feature commercial cooking as an activity, which makes it possible that the significant role of cooking equipment as heat sources for home natural gas fires may be repeated in non-home properties. Table 2-6 shows the shares of these fires by major property use group.

Natural gas non-home structure fires declined substantially from 1980 to 1998 but have shown a level trend in recent years.
Table 2-7 and Figure 2-2 show the trends in non-home fires starting with ignition of natural gas, from 1980 to 2011. Fires dropped by more than half from 1980 to 1998, then jumped to the levels of the early 1980s when NFIRS Version 5.0 was introduced. More recently, the trend has been roughly level but also highly variable from year to year.

Figure 2-2. Non-Home Structure Fires Starting With Ignition of Natural Gas



Note: See Note on Table 2-7. Source: NFIRS and NFPA survey.

Most non-home structure fires starting with ignition of natural gas involved cooking or heating equipment as the heat source.
Table 2-8 shows that the three leading heat sources, accounting for nearly two-thirds of the fires, involve equipment. Table 2-9 shows that cooking and heating equipment are the types of equipment involved for most non-home natural gas fires when equipment is involved. Washers and dryers, with 1% of non-home natural gas structure fires, had the largest equipment share for any equipment other than cooking and heating equipment.

Note that when equipment ignited gas, the gas ignited may not have been fueling the equipment that ignited the gas. In fact, pilot lights for equipment that is not turned on can serve as a heat source for gas leaking from anywhere near the pilot light, as can hot surfaces from any operating equipment near the released gas.

One-third (34%) of non-home structure fires starting with ignition of natural gas involved leak or break as a factor contributing to ignition.
Table 2-10 shows the leading factors contributing to ignition, most of which are consistent with equipment as the heat source. Some of the leading factors point to behaviors that could be made safer, including not replacing worn out equipment, abandoning materials like lit cigarettes, and not cleaning equipment regularly. Intentional fires accounted for 4% of non-home natural gas structure fires.

Three out of five (60%) non-home structure fires starting with ignition of natural gas began in a kitchen.
This is consistent with the large role of cooking equipment as heat sources in these fires. Table 2-11 shows the leading area of origin. The second leading area is heating equipment room or area, which is consistent with the large role of heating equipment as a heat source second only to cooking equipment.

Table 2-1. Home Structure Fires Starting With Ignition of Natural Gas, by Year

Year	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions) as Reported	in 2011 Dollars
1980	11,600	40	430	$38	$104
1981	11,750	77	626	$39	$96
1982	11,270	71	595	$35	$81
1983	9,890	85	613	$47	$106
1984	9,230	52	510	$39	$84
1985	9,100	45	528	$72	$150
1986	8,650	115	492	$45	$93
1987	8,040	73	419	$38	$75
1988	7,360	58	426	$42	$80
1989	6,700	39	394	$38	$70
1990	7,210	53	417	$51	$88
1991	6,830	62	410	$59	$98
1992	6,630	49	425	$40	$64
1993	6,380	27	418	$38	$59
1994	5,800	38	434	$46	$70
1995	5,580	47	283	$56	$83
1996	5,660	92	329	$70	$101
1997	4,870	27	231	$38	$53
1998	4,490	66	202	$39	$54
1999	6,230	0	136	$39	$53
2000	6,090	94	280	$45	$58
2001	6,210	47	320	$42	$53
2002	5,540	8	256	$70	$88
2003	5,550	47	282	$49	$60
2004	6,400	56	325	$50	$60
2005	5,900	44	240	$72	$83
2006	6,150	32	146	$59	$66
2007	6,010	47	166	$90	$98
2008	5,970	16	119	$57	$60
2009	5,790	30	174	$74	$78
2010	5,930	15	189	$62	$64
2011	5,940	40	278	$85	$85

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Also, because participation in NFIRS Version 5.0 was low in the early years (1999-2001), those estimates are especially volatile. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars.

Source: NFIRS and NFPA survey. Inflation adjustments based on consumer price index.

Table 2-2. Home Structure Fires Starting With Ignition of Natural Gas, 2007-2011 Annual Averages, by Heat Source

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Spark, ember or flame from operating equipment	1,650	(28%)	12	(40%)	65	(35%)	$20	(27%)
Unclassified heat from powered equipment	1,080	(18%)	4	(12%)	26	(14%)	$6	(9%)
Radiated or conducted heat from operating equipment	640	(11%)	0	(0%)	9	(5%)	$4	(5%)
Unclassified heat source	590	(10%)	2	(6%)	8	(4%)	$5	(7%)
Heat from direct flame or convection currents	390	(7%)	0	(0%)	4	(2%)	$2	(3%)
Flame or torch used for lighting	360	(6%)	0	(0%)	10	(5%)	$1	(2%)
Match	200	(3%)	6	(18%)	22	(12%)	$3	(4%)
Arcing	200	(3%)	2	(5%)	4	(2%)	$3	(4%)
Cigarette lighter	170	(3%)	6	(18%)	19	(10%)	$15	(21%)
Unclassified hot or smoldering object	150	(3%)	0	(0%)	0	(0%)	$1	(1%)
Lightning	140	(2%)	0	(0%)	2	(1%)	$6	(8%)
Hot ember or ash	50	(1%)	0	(0%)	0	(0%)	$0	(0%)
Heat or spark from friction	50	(1%)	0	(0%)	1	(1%)	$1	(1%)
Conducted heat from another fire	40	(1%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified chemical or natural heat source	30	(1%)	0	(0%)	1	(0%)	$1	(2%)
Other known heat source	180	(3%)	0	(0%)	14	(8%)	$4	(6%)
Total	5,930	(100%)	30	(100%)	185	(100%)	$73	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Heat Source reported as unknown or blank. Estimates for smoking material, metal, lighter candle, and other open flame sources include proportional shares of fires reported with Heat Source as "other" heat from open flame or smoking materials.

Source: NFIRS and NFPA survey.

Table 2-3. Home Structure Firs Starting With Ignition of Natural Gas, 2007-2011 Annual Averages, by Equipment Involved in Ignition

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Range with or without oven	1,880	(32%)	8	(25%)	25	(14%)	$5	(7%)
Portable or stationary space heater	910	(15%)	15	(48%)	19	(10%)	$5	(7%)
Water heater	660	(11%)	0	(0%)	48	(26%)	$11	(15%)
Oven or rotisserie	650	(11%)	0	(0%)	20	(11%)	$1	(1%)
Central heating unit	640	(11%)	4	(15%)	18	(10%)	$10	(13%)
No equipment involved	480	(8%)	0	(0%)	21	(11%)	$31	(42%)
Washer or dryer	170	(3%)	0	(0%)	0	(0%)	$3	(4%)
Grill, hibachi, or barbecue	150	(3%)	0	(0%)	5	(3%)	$0	(0%)
Fireplace, chimney or connector	90	(1%)	0	(0%)	10	(5%)	$0	(1%)
Portable cooking or warming device	50	(1%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified equipment	30	(1%)	0	(0%)	6	(3%)	$3	(4%)
Other known equipment*	220	(4%)	3	(11%)	13	(7%)	$4	(6%)
Total	5,930	(100%)	30	(100%)	185	(100%)	$73	(100%)

* Leading equipment for deaths not shown above is wiring and related equipment (11% of deaths).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Equipment Involved in Ignition reported or unknown or blank. Reports of no equipment involved are treated as unknown equipment unless Heat Source is coded as 40-99, indicating a known non-equipment Heat Source. Also, equipment reported with a code ending in two zeros is treated as a partial unknown and proportionally allocated (e.g., unclassified or unknown type cooking equipment..

Source: NFIRS and NFPA survey.

Table 2-4. Home Structure Fires Starting With Ignition of Natural Gas, 2007-2011 Annual Averages, by Factor Contributing to Ignition

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Leak or break	1,240	(21%)	12	(41%)	47	(25%)	$25	(33%)
Unclassified mechanical failure or malfunction	1,070	(18%)	2	(6%)	19	(10%)	$7	(10%)
Heat source too close to combustibles	590	(10%)	5	(15%)	10	(5%)	$4	(5%)
Equipment unattended	410	(7%)	0	(0%)	10	(6%)	$1	(2%)
Unclassified misuse of material or product	290	(5%)	6	(21%)	13	(7%)	$4	(6%)
Abandoned or discarded material	270	(5%)	0	(0%)	1	(0%)	$1	(1%)
Unclassified factor contributed to ignition	250	(4%)	5	(17%)	10	(5%)	$9	(13%)
Worn out	240	(4%)	0	(0%)	4	(2%)	$1	(1%)
Automatic control failure	230	(4%)	0	(0%)	3	(2%)	$1	(1%)
Unintentionally turned on or not turned off	200	(3%)	1	(5%)	12	(6%)	$2	(3%)
Failure to clean	190	(3%)	0	(0%)	4	(2%)	$1	(1%)
Storm	150	(2%)	0	(0%)	2	(1%)	$7	(9%)
Installation deficiency	100	(2%)	3	(10%)	2	(1%)	$2	(2%)
Improper startup	100	(2%)	0	(0%)	19	(10%)	$0	(0%)
Unclassified operational deficiency	80	(1%)	0	(0%)	2	(1%)	$1	(2%)
Unclassified electrical failure or malfunction	70	(1%)	0	(0%)	1	(0%)	$1	(2%)
Equipment not being operated properly	60	(1%)	0	(0%)	2	(1%)	$0	(0%)
Flammable liquid or gas spilled	60	(1%)	1	(5%)	18	(9%)	$3	(4%)
Unspecified short circuit arc	60	(1%)	0	(0%)	1	(0%)	$0	(1%)
Manual control failure	60	(1%)	0	(0%)	3	(1%)	$0	(0%)
Unclassified fire spread or control	40	(1%)	0	(0%)	0	(0%)	$0	(1%)
Collision, knock down, or turn over	40	(1%)	0	(0%)	2	(1%)	$1	(1%)
High water including floods	30	(1%)	0	(0%)	0	(0%)	$1	(1%)
Improper container or storage	30	(1%)	0	(0%)	1	(0%)	$0	(0%)
Arc or spark from operating equipment	30	(1%)	1	(5%)	6	(3%)	$1	(1%)
Other known factor	270	(5%)	0	(0%)	8	(4%)	$8	(11%)

Table 2-4. Home Structure Fires Starting With Ignition of Natural Gas, 2007-2011 annual Averages by Factor Contributing to Ignition (continued)

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Total	5,930	(100%)	30	(100%)	185	(100%)	$73	(100%)
Total factors	6,160	(104%)	37	(125%)	199	(107%)	$81	(110%)
All electrical failures or malfunctions	420	(7%)	3	(11%)	16	(9%)	$6	(8%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Factor Contributing to Ignition reported as none, unknown, or blank.

Source: NFIRS and NFPA survey. Inflation adjustments based on consumer price index.

Table 2-5. Home Structure Fires Starting With Ignition of Natural Gas, 2007-2011 Annual Averages, by Area of Origin

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Kitchen	3,360	(57%)	10	(34%)	64	(34%)	$17	(23%)
Heating equipment room	820	(14%)	1	(4%)	39	(21%)	$6	(9%)
Laundry room or area	200	(3%)	0	(0%)	2	(1%)	$5	(6%)
Duct for HVAC, cable, heating, or air conditioning	160	(3%)	0	(0%)	1	(0%)	$1	(1%)
Crawl space or substructure space	140	(2%)	2	(8%)	10	(6%)	$4	(6%)
Unclassified function area	130	(2%)	0	(0%)	7	(4%)	$2	(3%)
Unclassified area of origin	130	(2%)	0	(0%)	0	(0%)	$1	(1%)
Living room, family room, or den	110	(2%)	6	(20%)	12	(7%)	$2	(3%)
Garage*	80	(1%)	1	(4%)	4	(2%)	$5	(7%)
Exterior wall surface	80	(1%)	0	(0%)	1	(0%)	$2	(3%)
Attic or ceiling/roof assembly or concealed space	70	(1%)	0	(0%)	3	(2%)	$3	(4%)
Unclassified equipment or service area	60	(1%)	0	(0%)	2	(1%)	$2	(3%)
Wall assembly or concealed space	50	(1%)	0	(0%)	0	(0%)	$7	(10%)
Courtyard, terrace or patio	50	(1%)	0	(0%)	3	(1%)	$1	(2%)
Conduit, pipe, utility, or ventilation shaft	40	(1%)	0	(0%)	0	(0%)	$0	(1%)
Unclassified structural area	40	(1%)	1	(4%)	6	(3%)	$3	(4%)
Hallway or corridor	40	(1%)	0	(0%)	6	(3%)	$0	(0%)
Bedroom	40	(1%)	6	(20%)	4	(2%)	$1	(1%)
Closet	40	(1%)	0	(0%)	4	(2%)	$0	(1%)
Bathroom	40	(1%)	0	(0%)	4	(2%)	$1	(1%)
Unclassified outside area	30	(1%)	1	(4%)	1	(0%)	$2	(2%)
Other known area of origin	250	(4%)	1	(4%)	13	(7%)	$7	(10%)
Total	5,930	(100%)	30	(100%)	185	(100%)	$73	(100%)

* Does not include residential garage reported as separate property.
Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Area of Origin reported as unknown or blank.
Source: NFIRS and NFPA survey. Inflation adjustments based on consumer price index.

Table 2-6. Non-Home Structure Fires Starting With Ignition of Natural Gas, 2007-2011 Annual Averages, by Major Property Use Group

Property Use	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Public assembly	940	(44%)	0	(0%)	15	(35%)	$9	(20%)
Stores and offices	360	(17%)	1	(58%)	9	(21%)	$6	(14%)
Residential	360	(17%)	1	(42%)	6	(15%)	$2	(4%)
Educational	110	(5%)	0	(0%)	2	(5%)	$0	(0%)
Health care or correction	90	(4%)	0	(0%)	0	(0%)	$0	(1%)
Outside or special property	90	(4%)	0	(0%)	0	(0%)	$0	(0%)
Manufacturing	70	(3%)	0	(0%)	0	(1%)	$11	(24%)
Storage	50	(2%)	0	(0%)	3	(6%)	$8	(18%)
Industrial, utility, defense, agriculture, or mining	40	(2%)	0	(0%)	6	(14%)	$8	(17%)
Unclassified	10	(0%)	0	(0%)	1	(1%)	$0	(0%)
None or undetermined	40	(2%)	0	(0%)	0	(1%)	$1	(1%)
Total	2,150	(100%)	2	(100%)	41	(100%)	$45	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars.

Source: NFIRS and NFPA survey. Inflation adjustments based on consumer price index.

Table 2-7. Non-Home Structure Fires Starting With Ignition of Natural Gas, by Year

Year	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions) as Reported	in 2011 Dollars
1980	2,790	0	117	$17	$47
1981	2,270	0	140	$29	$71
1982	2,530	11	235	$24	$56
1983	2,030	0	254	$17	$38
1984	2,010	4	90	$34	$73
1985	2,040	12	88	$21	$44
1986	2,070	0	83	$18	$37
1987	1,700	0	107	$28	$55
1988	1,580	7	127	$13	$24
1989	1,520	7	82	$19	$35
1990	1,380	25	82	$242	$416
1991	1,400	9	65	$16	$27
1992	1,470	5	97	$31	$49
1993	1,390	2	54	$19	$30
1994	1,320	0	61	$22	$33
1995	1,190	0	77	$38	$57
1996	1,130	2	49	$16	$23
1997	1,200	0	33	$20	$28
1998	1,190	0	56	$17	$23
1999	2,340	0	0	$28	$37
2000	1,880	0	0	$10	$14
2001	2,590	0	80	$113	$144
2002	2,200	11	62	$22	$28
2003	2,700	6	87	$15	$18
2004	2,290	14	30	$46	$54
2005	1,900	0	54	$54	$63
2006	2,130	0	54	$15	$17
2007	2,410	5	40	$58	$63
2008	2,300	7	38	$72	$75
2009	2,000	0	39	$22	$23
2010	2,000	0	46	$25	$25
2011	2,020	0	41	$49	$49

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Also, because participation in NFIRS Version 5.0 was low in the early years (1999-2001), those estimates are especially volatile. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars.

Source: NFIRS and NFPA survey. Inflation adjustment based on consumer price index.

Table 2-8. Non-Home Structure Fires Starting With Ignition of Natural Gas, 2007-2011 Annual Averages, by Heat Source

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Spark, ember or flame from operating equipment	750	(35%)	1	(58%)	17	(41%)	$23	(51%)
Unclassified heat from powered equipment	390	(18%)	0	(0%)	4	(9%)	$5	(11%)
Radiated or conducted heat from operating equipment	240	(11%)	0	(0%)	2	(5%)	$2	(4%)
Flame or torch used for lighting	190	(9%)	0	(0%)	10	(23%)	$0	(1%)
Unclassified heat source	180	(8%)	0	(0%)	1	(3%)	$7	(16%)
Heat from direct flame or convection currents	90	(4%)	0	(0%)	1	(1%)	$0	(1%)
Arcing	50	(3%)	0	(0%)	1	(2%)	$2	(4%)
Unclassified hot or smoldering object	50	(3%)	0	(0%)	0	(0%)	$0	(0%)
Match	50	(2%)	1	(42%)	0	(0%)	$1	(1%)
Unclassified heat spread from another fire	20	(1%)	0	(0%)	0	(0%)	$0	(1%)
Cigarette lighter	20	(1%)	0	(0%)	3	(8%)	$0	(0%)
Heat or spark from friction	20	(1%)	0	(0%)	1	(2%)	$3	(6%)
Lightning	20	(1%)	0	(0%)	0	(0%)	$1	(2%)
Molten or hot material	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Hot ember or ash	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Other known heat source	50	(2%)	0	(0%)	2	(5%)	$1	(3%)
Total	2,150	(100%)	2	(100%)	41	(100%)	$45	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. Separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of firse with Heat Source reported as unknown or blank. Estimates for smoking material, match, lighter, candle, and other open flame sources include proportional shares of fires reported with Heat Source as "other" heat from open flame or smoking materials.

Source: NFIRS and NFPA survey.

Table 2-9. Non-Home Structure Fires Starting With Ignition of Natural Gas, 2007-2011 Annual Averages, by Equipment Involved in Ignition

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Range with or without oven	460	(22%)	0	(0%)	3	(7%)	$5	(12%)
Deep fryer	430	(20%)	0	(0%)	8	(18%)	$14	(31%)
Portable or stationary space heater	230	(11%)	0	(0%)	7	(17%)	$1	(3%)
Central heating unit	210	(10%)	0	(0%)	4	(9%)	$4	(9%)
Water heater	200	(9%)	0	(0%)	9	(21%)	$2	(4%)
No equipment involved	150	(7%)	0	(0%)	3	(8%)	$6	(13%)
Grill	120	(6%)	0	(0%)	3	(7%)	$0	(1%)
Oven or rotisserie	90	(4%)	2	(100%)	3	(7%)	$0	(1%)
Portable cooking or warming equipment	40	(2%)	0	(0%)	0	(0%)	$0	(0%)
Fireplace, chimney or connector	30	(1%)	0	(0%)	0	(0%)	$1	(1%)
Unclassified portable appliance designed to produce heat	20	(1%)	0	(0%)	0	(0%)	$0	(0%)
Washer or dryer	20	(1%)	0	(0%)	0	(0%)	$0	(1%)
Torch, burner or soldering equipment	20	(1%)	0	(0%)	1	(3%)	$0	(1%)
Incinerator	20	(1%)	0	(0%)	0	(0%)	$0	(1%)
Heat treating equipment	20	(1%)	0	(0%)	0	(0%)	$0	(0%)
Steamline, heat pipe, or hot air duct	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Lamp, light bulb or light fixture	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Other known equipment	60	(3%)	0	(0%)	1	(3%)	$11	(24%)
Total	2,150	(100%)	2	(100%)	41	(100%)	$45	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Equipment Involved in Ignition reported as unknown or blank. Reports of no equipment involved are treated as unknown equipment unless Heat Source is coded as 40-99, indicating a known non-equipment Heat Source. Also, equipment reported with a code ending in two zeros is treated as a partial unknown and proportionally allocated (e.g., unclassified or unknown type cooking equipment).

Source: NFIRS and NFPA survey. Inflation adjustment based on consumer price index.

Table 2-10. Non-Home Structure Fires Starting With Ignition of Natural Gas, 2007-2011 Annual Averages, by Factor Contributing to Ignition

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Leak or break	730	(34%)	1	(58%)	14	(34%)	$16	(35%)
Unclassified mechanical failure or malfunction	360	(17%)	1	(42%)	3	(8%)	$10	(22%)
Worn out	120	(6%)	0	(0%)	2	(6%)	$0	(0%)
Abandoned or discarded material	110	(5%)	0	(0%)	0	(0%)	$0	(0%)
Automatic control failure	110	(5%)	0	(0%)	2	(4%)	$1	(1%)
Failure to clean	100	(5%)	0	(0%)	1	(3%)	$0	(0%)
Unclassified operational deficiency	80	(4%)	0	(0%)	0	(0%)	$0	(0%)
Heat source too close to combustibles	70	(3%)	0	(0%)	0	(0%)	$1	(1%)
Unclassified misuse of material or product	60	(3%)	1	(42%)	6	(15%)	$0	(0%)
Unclassified factor contributed to ignition	60	(3%)	0	(0%)	1	(3%)	$1	(2%)
Manual control failure	60	(3%)	0	(0%)	0	(0%)	$0	(0%)
Unintentionally turned on or not turned off	50	(2%)	0	(0%)	1	(1%)	$1	(1%)
Improper startup	50	(2%)	0	(0%)	6	(14%)	$0	(0%)
Collision, knock down, or turn over	40	(2%)	0	(0%)	1	(2%)	$11	(24%)
Equipment unattended	40	(2%)	0	(0%)	1	(2%)	$0	(0%)
Equipment not being operated properly	30	(1%)	0	(0%)	0	(0%)	$0	(0%)
Installation deficiency	20	(1%)	0	(0%)	1	(3%)	$1	(2%)
Unclassified electrical failure or malfunction	20	(1%)	0	(0%)	0	(0%)	$0	(0%)
Flammable liquid or gas spilled	20	(1%)	0	(0%)	2	(4%)	$0	(0%)
Storm	20	(1%)	0	(0%)	0	(0%)	$3	(6%)
Unspecified short circuit arc	20	(1%)	0	(0%)	2	(4%)	$0	(0%)
Arc or spark from operating equipment	10	(1%)	0	(0%)	1	(2%)	$0	(0%)
Short circuit arc from defective or worn insulation	10	(1%)	0	(0%)	1	(2%)	$1	(2%)
Unclassified design, manufacturing or installation deficiency	10	(1%)	0	(0%)	0	(0%)	$0	(0%)

Table 2-10. Non-Home Structure Fires Starting With Ignition of Natural Gas, 2007-2011 Annual Averages, by Factor Contributing to Ignition (Continued)

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Other known factor	60	(3%)	0	(0%)	1	(3%)	$4	(9%)
Total	2,150	(100%)	2	(100%)	41	(100%)	$45	(100%)
Total factors	2,260	(105%)	3	(142%)	45	(109%)	$48	(107%)
All electrical failures or malfunctions	70	(3%)	0	(0%)	3	(7%)	$1	(2%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Factor Contributing to Ignition reported as none, unknown or blank.

Source: NFIRS and NFPA survey. Inflation adjustment based on consumer price index.

Table 2-11. Non-Home Structure Fires Starting With Ignition of Natural Gas, 2007-2011 Annual Averages, by Area of Origin

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Kitchen	1,280	(60%)	2	(100%)	19	(45%)	$4	(9%)
Heating equipment room	220	(10%)	0	(0%)	6	(14%)	$2	(3%)
Unclassified equipment or service area	70	(3%)	0	(0%)	4	(9%)	$3	(6%)
Laundry room or area	40	(2%)	0	(0%)	0	(1%)	$0	(0%)
Unclassified outside area	40	(2%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified function area	30	(2%)	0	(0%)	0	(0%)	$0	(0%)
Duct for HVAC, cable, exhaust, heating, or air conditioning	30	(2%)	0	(0%)	0	(0%)	$0	(1%)
Incinerator room or area	30	(1%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified storage area	30	(1%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified area of origin	20	(1%)	0	(0%)	1	(2%)	$4	(9%)
Processing or manufacturing area or workroom	20	(1%)	0	(0%)	3	(8%)	$3	(6%)
Exterior roof surface	20	(1%)	0	(0%)	0	(0%)	$0	(0%)
Storage room, area, tank, or bin	20	(1%)	0	(0%)	0	(0%)	$1	(2%)
Conduit, pipe, utility, or ventilation shaft	20	(1%)	0	(0%)	0	(0%)	$3	(6%)
Maintenance or paint shop or area	20	(1%)	0	(0%)	0	(0%)	$1	(3%)
Unclassified service facility	20	(1%)	0	(0%)	0	(0%)	$1	(2%)
Machinery room or area	20	(1%)	0	(0%)	2	(5%)	$1	(2%)
Closet	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified structural area	10	(1%)	0	(0%)	0	(0%)	$0	(1%)
Wall assembly or concealed space	10	(1%)	0	(0%)	0	(0%)	$0	(1%)
Dining room, bar or cafeteria	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Lobby or entrance way	10	(1%)	0	(0%)	1	(1%)	$0	(0%)
Garage*	10	(1%)	0	(0%)	0	(0%)	$0	(1%)

Table 2-11. Non-Home Structure Fires Starting With Ignition of Natural Gas, 2007-2011 Annual Averages, by Area of Origin (Continued)

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Other known area of origin	140	(7%)	0	(0%)	6	(16%)	$21	(47%)
Total	2,150	(100%)	2	(100%)	41	(100%)	$45	(100%)

* May not include or be limited to garages coded as property use.

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Area of Origin reported as unknown or blank.

Source: NFIRS and NFPA survey. Inflation adjustment based on consumer price index.

Section 3. LP-Gas

During 2007-2011, an average of 13,340 fires per year were reported as having begun with the ignition of LP-gas as the type of material first ignited.
These fires caused an average of 46 civilian deaths per year, 349 civilian injuries per year, and $100 million in direct property damage per year.

Table 3-A.1, 3-A.2, and 3-A.3 show how these fires divide, first into fires at homes versus any other property use, and within those two groups, into structure, vehicle, and outdoor or other fires. Nearly all home losses are in structure fires, but nearly half of the fires are not in structure fires. Vehicle fires are a much larger share of non-home fires than home fires.

Table 3-A.1. Fires Starting With Ignition of LP-Gas
2007-2011 Annual Averages, by Property Use

Property Use	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Home	7,620	(57%)	34	(74%)	190	(54%)	$62	(62%)
Non-home	5,720	(43%)	12	(26%)	159	(46%)	$38	(38%)
Total	13,340	(100%)	46	(100%)	349	(100%)	$100	(100%)

Note: See text box on p. 46 for details on calculations. Source: NFIRS and NFPA survey.

Table 3-A.2. Home Fires Starting With Ignition of LP-Gas
2007-2011 Annual Averages, by Incident Type

Incident Type	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Structure fire	3,110	(41%)	34	(100%)	160	(84%)	$61	(97%)
Vehicle fire	70	(1%)	0	(0%)	6	(3%)	$1	(1%)
Outdoor or other fire	4,440	(58%)	0	(0%)	24	(13%)	$1	(2%)
Total	7,620	(100%)	34	(100%)	190	(100%)	$62	(100%)

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

Table 3-A.3. Non-Home Fires Starting With Ignition of LP-Gas
2007-2011 Annual Averages, by Incident Type

Incident Type	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Structure fire	1,090	(19%)	8	(66%)	76	(48%)	$29	(76%)
Vehicle fire	540	(9%)	3	(25%)	58	(36%)	$8	(19%)
Outdoor or other fire	4,090	(72%)	1	(9%)	25	(16%)	$2	(5%)
Total	5,720	(100%)	12	(100%)	159	(100%)	$38	(100%)

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

Data Sources, Definitions and Conventions Used in This Section

Unless otherwise specified, the statistics in this analysis are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to federal or state agencies or industrial fire brigades. These estimates are projections based on the detailed information collected in Version 5.0 of the U.S. Fire Administration's National Fire Incident Reporting System (NFIRS 5.0) and the National Fire Protection Association's (NFPA's) annual fire department experience survey. In general, any fire that occurs in or on a structure is considered a structure fire, even if the fire was limited to contents and the building itself was not damaged.

"Home" includes one- and two-family homes, manufactured homes, and multi-family housing, including apartments.

Flammable gases are identified in NFIRS 5.0 Type of Material First Ignited:

10 - Unclassified or unknown type flammable gas, including benzene, benzol, carbon disulfide, carbon monoxide, ethylene, ethylene oxide, and vinyl chloride. Corresponds to codes 10 (unknown and 19 (unclassified) in earlier version of NFIRS and may include Codes 13 (manufactured gas) and 17 (specialty gas other than anesthetic) in earlier versions of NFIRS.
11 – Natural gas, including methane and swamp gas.
12 – LP-gas, including butane, propane, and butane-air mixture, which was coded separately as LP-City gas in earlier versions of NFIRS.
13 – Anesthetic gas, which was code 15 in earlier versions of NFIRS.
14 – Acetylene gas, which was code 16 in earlier versions of NFIRS.
15 – Hydrogen, which was not separately identified in earlier version of NFIRS.

NFIRS 5.0 includes a category of structure fires collectively referred to as "confined fires," identified by incident type. These include confined cooking fires, confined chimney or flue fires, confined trash fires, confined fuel burner or boiler fires, confined commercial compactor fires, and confined incinerator fires (incident type 113-118). Losses are generally minimal in these fires, which by definition, are assumed to have been limited to the object of origin. Although detailed data is not required for these fires, it is sometimes present.

Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Property damage has not been adjusted for inflation. Fires are rounded to the nearest ten, civilian deaths and injuries to the nearest one, and direct property damage to the nearest million. Additional details on the methodology may be found in Appendix A.

Reporting of Type of Material First Ignited is not required if Item First Ignited is coded in the range of 70 to 99. As with confined fires, the field is nevertheless reported for many fires, but the percentage of unknowns and blanks is higher. Fires are analyzed separately for (1) non-confined structure fires, (2) confined structure fires, (3) vehicle fires, (4) outdoor or other vegetation fires, and (5) outdoor or other non-vegetation fires (principally trash). For each of these, fires are analyzed separately for Item First Ignited 70-99 and Item First Ignited not 70-99.

In 2009, more homes used natural gas (69.2 million housing units) than LP-gas (48.9 million housing units).
These figures include use of outdoor grills, which means risk should be calculated using total home fires, including structure, vehicle and outdoor and other. (See Table 3-B.)

Table 3-B. Home Fires Starting With Ignition of Natural or LP-Gas 2007-2011 Annual Averages, by Incident Type

	Natural gas				LP-gas			
Incident Type	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)
Structure	5,930	30	185	$73	3,110	34	160	
Vehicle	20	1	2	$0	70	0	6	$1
Outdoor or other	1,950	0	7	$1	4,440	0	24	$1
Total	7,900	31	194	$75	7,620	34	190	$62

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

LP-gas has a much larger share of its home fires outdoors, which is understandable because grill users constitute a much larger share of total LP-gas users than natural gas users. (See Table 3-C.)

Table 3-C. Homes Using Natural or LP Gas, by Type of Use

	Millions of Housing Units Using	
	Natural gas	LP-gas
Heating	57.2	8.0
Main	55.6	5.6
Central warm-air furnace	44.3	3.9
Other (including steam or hot water system, built-in room heater, floor or wall pipeless system)	11.3	1.7
Secondary	7.2	2.8
Fireplace	4.8	1.5
Other (including central warm-air furnace)	2.5	1.4
Water heating	58.4	4.2
Cooking	39.2	5.7
Other (e.g., outdoor grill, clothes dryer)	21.5	43.9
Clothes dryer	17.4	1.0
Total	69.2	48.9

Note: See text box for details on calculations
Source: Table HC1.1, "Fuels Used and End Uses in U.S. Homes, by Housing Unit type, 2009," 2009 Residential Energy Consumption survey, http://www.eia.gov/consumption/residential/data/2009/#undefined.

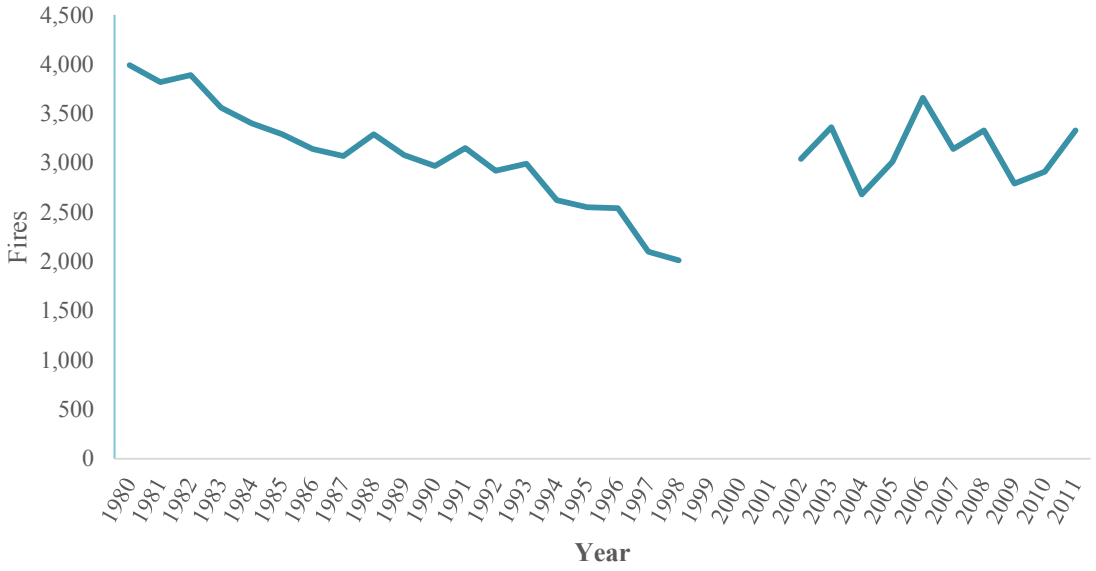
The ratio of natural gas user homes to LP-gas user homes (1.4-to-1) implied by Table 3-C is higher than the ratios for home fires and losses implied by Table 3-B, which implies a higher combined risk for LP-gas. However, the uses are so different for the two gases that it may reflect differences in risk between central warm-air heating equipment (the principal use for natural gas) and outdoor gas grills (the principal use for LP-gas) more than inherent differences in risk between the two types of gas.

A. Homes

LP-gas home structure fires declined substantially from 1980 to 1998 but have shown no consistent trend up or down in recent years.

Table 3-1 and Figure 3-1 show the trends in home fires starting with ignition of LP-gas, from 1980 to 2011. Fires dropped by nearly half from 1980 to 1998, then jumped to the levels of the early 1980s when NFIRS Version 5.0 was introduced. More recently, the trend has been level with considerable year-to-year variation.

Figure 3-1. Home Structure Fires Starting With Ignition of LP-Gas



Note: See Note on Table 3-1. Source: NFIRS and NFPA survey.

Most home structure fires starting with ignition of LP-gas involve cooking or heating equipment as the heat source.

Table 3-2 shows three of the five leading heat sources, accounting for nearly half the fires, involve equipment. Table 3-3 shows that cooking and heating equipment are the types of equipment involved for most home LP-gas fires when equipment is involved. Because these are structure fires, they do not reflect the large role of gas grills in outdoor home fires starting with LP-gas, but even so, grills are the leading type of equipment for home structure LP-gas fires with roughly half (49%) of the fires. Torches, burners, and soldering equipment, with 1% of home LP-gas structure fires, had the largest equipment share for any equipment other than cooking and heating equipment.

Note that when equipment ignites gas, the gas ignited may not have been fueling the equipment that ignited the gas. In fact, pilot lights for equipment that is not turned on can serve as a heat source for gas leaking from anywhere near the pilot light, as can hot surfaces from any operating equipment near the released gas.

One-third (35%) of home structure fires starting with ignition of LP-gas involved a leak or break as a factor contributing to ignition.
Table 3-4 shows the leading factors contributing to ignition, most of which are consistent with equipment as the heat source. Some of the leading factors point to behaviors that could be made safer, including insufficient separation between heat source and combustible, and leaving equipment (such as cooking equipment) unattended. Intentional fires accounted for 5% of home LP-gas structure fires.

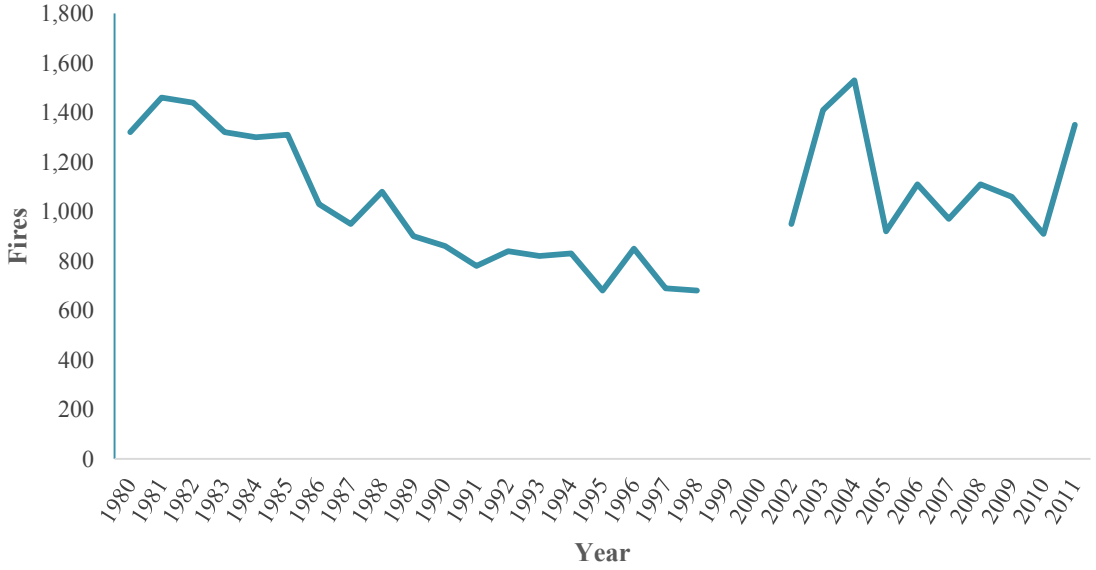
Four of ten (40%) home structure fires starting with ignition of LP-gas began in the courtyard, terrace or patio (16%), exterior balcony or unenclosed porch (13%), or unclassified outside area (11%), suggesting a gas grill fire that spread to the home.
Another 18% of fires began in kitchens. This is all consistent with the large role of cooking equipment in general and grills in particular as heat sources in these fires. Table 3-5 shows the leading areas of origin.

B. Properties Other Than Homes

More than half (56%) of non-home structure fires starting with ignition of LP-gas occur at public assembly (23%), residential (22%), or store or office (11%) properties.
Many of these places feature commercial cooking as an activity, which makes it possible that the significant role of cooking equipment as heat sources for home gas fires may be repeated in non-home properties. The other leading property use group is outside or special property (20% of fires), which suggests outdoor grill fires that spread to nearby structures, at least for public assembly and residential properties. Table 3-6 shows the shares of non-home LP-gas structure fires by major property use group.

LP-gas non-home structure fires declined substantially from 1980 to 1998 but have shown no consistent trend in recent years.
Table 3-7 and Figure 3-2 show the trends in non-home fires, starting with ignition of LP-gas, from 1980 to 2011. Fires dropped by about half from 1980 to 1998, then jumped to the levels of the early 1980s shortly after NFIRS Version 5.0 was introduced. More recently, year-to-year variations have been large, with no clear trend up or down.

Figure 3-2. Non-Home Structure Fires Starting With Ignition of LP-Gas



Note: See Note on Table 3-7. Source: NFIRS and NFPA survey.

Most non-home structure fires starting with ignition of LP-gas involve cooking or heating equipment as the heat source.
Table 3-8 shows three of the six leading heat sources, accounting for nearly half of the fires, involve equipment. Table 3-9 shows that cooking and heating equipment are the types of equipment involved for most non-home LP-gas fires when equipment is involved. Torches, burners, and soldering equipment, with 2% of non-home LP-gas structure fires, had the largest equipment share for any equipment other than cooking and heating equipment.

Note that when equipment ignites gas, the gas ignited may not have been fueling the equipment that ignited the gas, In fact, pilot lights for equipment that is not turned on can serve as a heat source for gas leaking from anywhere near the pilot light, as can hot surfaces from any operating equipment near the released gas.

One-third (36%) of non-home structure fires starting with ignition of LP-gas involved leak or break as a factor contributing to ignition.
Table 3-10 shows the leading factors contributing to ignition, most of which are consistent with equipment as the heat source. Some of the leading factors point to behaviors that could be made safer, including insufficient separation between heat source and combustible, and spills (or perhaps releases) of flammable liquid or gas. Intentional fires accounted for 4% of non-home LP-gas structure fires.

One-third (34%) of non-home structure fires starting with ignition of LP-gas began in a kitchen.
This is consistent with the large role for cooking equipment as heat sources in these fires. Table 3-11 shows the leading areas of origin.

Table 3-1. Home Structure Fires Starting With Ignition of LP-Gas, by Year

Year	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions) as Reported	Direct Property Damage (in Millions) in 2011 Dollars
1980	3,990	79	418	$29	$80
1981	3,820	66	422	$27	$67
1982	3,890	38	382	$23	$54
1983	3,560	63	355	$28	$62
1984	3,400	46	307	$32	$69
1985	3,290	48	339	$32	$67
1986	3,140	38	235	$27	$56
1987	3,070	43	371	$24	$47
1988	3,290	33	336	$44	$83
1989	3,080	43	324	$26	$46
1990	2,970	47	315	$34	$59
1991	3,150	22	345	$50	$82
1992	2,920	55	343	$76	$122
1993	2,990	48	334	$46	$71
1994	2,620	12	297	$40	$61
1995	2,550	25	299	$47	$70
1996	2,540	38	216	$37	$53
1997	2,100	54	185	$29	$41
1998	2,010	41	277	$34	$47
1999	3,600	0	545	$40	$54
2000	3,490	31	298	$64	$84
2001	2,690	9	276	$56	$71
2002	3,040	0	245	$43	$54
2003	3,360	63	175	$77	$94
2004	2,680	19	134	$33	$39
2005	3,010	28	204	$35	$40
2006	3,660	41	191	$40	$44
2007	3,140	30	178	$77	$84
2008	3,330	21	164	$72	$75
2009	2,790	28	131	$52	$54
2010	2,910	30	161	$58	$60
2011	3,330	63	166	$44	$44

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Also, because participation in NFIRS Version 5.0 was low in the early years (1999-2001), those estimates are especially volatile. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars.

Source: NFIRS and NFPA survey. Inflation adjustments based on consumer price index.

Table 3-2. Home Structure Fires Starting With Ignition of LP-Gas, 2007-2011 Annual Averages, by Heat Source

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Spark, ember or flame from operating equipment	990	(32%)	14	(41%)	44	(28%)	$14	(23%)
Unclassified heat source	420	(13%)	0	(0%)	17	(11%)	$6	(10%)
Radiated or conducted heat from operating equipment	290	(9%)	2	(6%)	16	(10%)	$3	(6%)
Flame or torch used for lighting	240	(8%)	7	(21%)	8	(5%)	$6	(9%)
Unclassified heat from powered equipment	200	(7%)	3	(8%)	4	(3%)	$3	(4%)
Heat from direct flame or convection currents	180	(6%)	1	(4%)	5	(3%)	$3	(5%)
Match	160	(5%)	2	(7%)	18	(11%)	$5	(9%)
Cigarette lighter	140	(4%)	0	(0%)	21	(13%)	$3	(6%)
Unclassified hot or smoldering object	70	(2%)	0	(0%)	3	(2%)	$0	(1%)
Arcing	70	(2%)	1	(4%)	9	(6%)	$2	(4%)
Unclassified heat spread from another fire	70	(2%)	1	(2%)	0	(0%)	$2	(4%)
Lightning	60	(2%)	0	(0%)	1	(0%)	$4	(7%)
Hot ember or ash	40	(1%)	0	(0%)	0	(0%)	$0	(1%)
Radiated heat from another fire	30	(1%)	0	(0%)	1	(0%)	$0	(0%)
Candle	30	(1%)	0	(0%)	5	(3%)	$0	(1%)
Unclassified chemical or natural heat source	20	(1%)	1	(4%)	1	(0%)	$1	(1%)
Other known heat source*	100	(3%)	1	(4%)	7	(4%)	$6	(10%)
Total	3,110	(100%)	34	(100%)	160	(100%)	$61	(100%)

* Leading heat source for deaths not shown above is unclassified fireworks or explosives (4% of deaths).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. Separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Also, because participation in NFIRS Version 5.0 was low in the early years (1999-2001), those estimates are especially volatile. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Heat Source reported as unknown or blank. Estimates for smoking material, match, lighter, candle, and other open flame sources include proportional shares of fires reported with Heat Source as "other" heat from open flame or smoking materials.

Source: NFIRS and NFPA survey. Inflation adjustments based on consumer price index.

Table 3-3. Home Structure Fires Starting With Ignition of LP-Gas, 2007-2011 Annual Averages, by Equipment Involved in Ignition

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Grill, hibachi, or barbecue	1,530	(49%)	3	(9%)	42	(26%)	$15	(25%)
No equipment involved	320	(10%)	1	(4%)	14	(9%)	$22	(36%)
Range with or without oven	310	(10%)	3	(10%)	13	(8%)	$1	(2%)
Portable or stationary space heater	280	(9%)	6	(16%)	39	(24%)	$10	(16%)
Water heater	190	(6%)	6	(18%)	10	(6%)	$4	(7%)
Unclassified equipment	120	(4%)	0	(0%)	2	(1%)	$2	(3%)
Central heating unit	90	(3%)	12	(34%)	14	(8%)	$2	(2%)
Oven or rotisserie	80	(2%)	0	(0%)	2	(1%)	$0	(0%)
Deep fryer	30	(1%)	0	(0%)	2	(1%)	$0	(0%)
Torch, burner or soldering equipment	30	(1%)	0	(0%)	2	(1%)	$1	(2%)
Fireplace, chimney or connector	20	(1%)	0	(0%)	9	(6%)	$1	(2%)
Washer or dryer	20	(1%)	0	(0%)	3	(2%)	$0	(0%)
Gas regulator	20	(1%)	0	(0%)	0	(0%)	$0	(0%)
Other known equipment*	70	(2%)	3	(8%)	10	(6%)	$2	(3%)
Total	3,110	(100%)	34	(100%)	160	(100%)	$61	(100%)

* Leading equipment for deaths not shown above is power drill or screwdriver (8% of deaths).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Equipment Involved in Ignition reported as unknown or blank. Reports of no equipment involved are treated as unknown equipment unless Heat Source is coded as 40-99, indicating a known non-equipment Heat Source. Also, equipment reported with a code ending in two zeros is treated as a partial unknown and proportionally allocated (e.g., unclassified or unknown type cooking equipment.

Source: NFIRS and NFPA survey.

Table 3.4. Home Structure Fires Starting With Ignition of LP-Gas, 2007-2011 Annual Averages, by Factor Contributing to Ignition

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Leak or break	1,080	(35%)	12	(35%)	56	(35%)	$24	(39%)
Unclassified mechanical failure or malfunction	490	(16%)	4	(12%)	22	(14%)	$7	(12%)
Heat source too close to combustibles	230	(7%)	1	(4%)	15	(10%)	$5	(8%)
Worn out	170	(6%)	0	(0%)	5	(3%)	$1	(1%)
Unclassified misuse of material or product	140	(4%)	5	(16%)	6	(4%)	$5	(9%)
Outside or open fire for warming or cooking	120	(4%)	0	(0%)	0	(0%)	$1	(1%)
Failure to clean	100	(3%)	0	(0%)	0	(0%)	$0	(0%)
Equipment unattended	90	(3%)	2	(5%)	3	(2%)	$3	(5%)
Flammable liquid or gas spilled	90	(3%)	4	(12%)	11	(7%)	$2	(4%)
Installation deficiency	90	(3%)	1	(4%)	5	(3%)	$2	(3%)
Unclassified factor contributed to ignition	80	(2%)	1	(4%)	9	(5%)	$5	(8%)
Equipment not being operated properly	60	(2%)	0	(0%)	4	(2%)	$1	(1%)
Abandoned or discarded material	60	(2%)	2	(5%)	0	(0%)	$1	(2%)
Improper fueling technique	60	(2%)	0	(0%)	1	(1%)	$1	(2%)
Storm	50	(2%)	0	(0%)	1	(1%)	$1	(2%)
Automatic control failure	50	(2%)	2	(5%)	5	(3%)	$0	(0%)
Improper startup	40	(1%)	1	(2%)	14	(9%)	$1	(2%)
Manual control failure	30	(1%)	0	(0%)	1	(1%)	$1	(1%)
Unclassified operational deficiency	30	(1%)	0	(0%)	2	(1%)	$0	(1%)
Design deficiency	30	(1%)	0	(0%)	2	(1%)	$0	(0%)
Unclassified design, manufacturing, or installation deficiency	30	(1%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified electrical failure or malfunction	30	(1%)	1	(4%)	0	(0%)	$1	(1%)
Exposure fire	20	(1%)	0	(0%)	1	(1%)	$0	(1%)
Unintentionally turned on or not turned off	20	(1%)	0	(0%)	3	(2%)	$1	(1%)
Arc or spark from operating equipment	20	(1%)	2	(5%)	1	(0%)	$0	(0%)
Backfire	20	(1%)	0	(0%)	0	(0%)	$0	(0%)

Table 3.4. Home Structure Fires Starting With Ignition of LP-Gas, 2007-2011 Annual Averages, by Factor Contributing to Ignition (Continued)

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Other known factor*	110	(4%)	3	(8%)	3	(2%)	$3	(6%)
Total	3,110	(100%)	34	(100%)	160	(100%)	$61	(100%)
Total factors	3,290	(106%)	41	(120%)	170	(106%)	$67	(110%)

* Leading factor for deaths not shown above is equipment used for not intended purpose (4% of deaths).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Heat Source reported as unknown or blank. Estimates include proportional shares of fires with Factor Contributing to Ignition reported as none, unknown, or blank.

Source: NFIRS and NFPA survey.

Table 3.5. Home Structure Fires Starting With Ignition of LP-Gas, 2007-2011 Annual Averages, by Area of Origin

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Kitchen	570	(18%)	6	(16%)	31	(19%)	$4	(6%)
Courtyard, terrace or patio	500	(16%)	1	(3%)	19	(12%)	$3	(6%)
Exterior balcony or unenclosed porch	400	(13%)	0	(0%)	8	(5%)	$8	(12%)
Unclassified outside area	330	(11%)	1	(2%)	3	(2%)	$9	(14%)
Unclassified area of origin	190	(6%)	0	(0%)	1	(0%)	$2	(3%)
Heating equipment room	150	(5%)	5	(15%)	12	(7%)	$3	(5%)
Garage*	110	(4%)	3	(8%)	9	(6%)	$3	(5%)
Unclassified function area	100	(3%)	0	(0%)	6	(4%)	$2	(3%)
Crawl space or substructure space	60	(2%)	8	(22%)	11	(7%)	$5	(8%)
Fuel tank or fuel line of vehicle	60	(2%)	0	(0%)	1	(0%)	$0	(0%)
Laundry room or area	60	(2%)	0	(0%)	5	(3%)	$2	(4%)
Living room, family room, or den	60	(2%)	2	(6%)	14	(9%)	$4	(6%)
Exterior wall surface	50	(2%)	0	(0%)	0	(0%)	$2	(3%)
Unclassified structural area	40	(1%)	4	(12%)	1	(1%)	$2	(4%)
Exterior surface of vehicle	40	(1%)	0	(0%)	3	(2%)	$0	(0%)
Bedroom	30	(1%)	2	(6%)	13	(8%)	$1	(2%)
Duct for HVAC, cable, heating, or air conditioning	30	(1%)	1	(4%)	1	(1%)	$0	(0%)
Unclassified equipment or service area	30	(1%)	0	(0%)	3	(2%)	$1	(1%)
Exterior stairway or fire escape	30	(1%)	0	(0%)	1	(1%)	$1	(1%)
Wall assembly or concealed space	30	(1%)	0	(0%)	1	(0%)	$0	(0%)
Closet	30	(1%)	0	(0%)	4	(2%)	$1	(1%)
Unclassified means of egress	30	(1%)	0	(0%)	0	(0%)	$0	(0%)
Bathroom	20	(1%)	1	(3%)	2	(1%)	$0	(1%)
Unclassified storage area	20	(1%)	0	(0%)	1	(1%)	$0	(1%)
Lawn, field or open area	20	(1%)	0	(0%)	1	(1%)	$0	(0%)

Table 3.5. Home Structure Fires Starting With Ignition of LP-Gas, 2007-2011 Annual Averages, by Area of Origin (Continued)

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Other known area of origin	150	(5%)	1	(3%)	10	(6%)	$7	(12%)
Total	3,110	(100%)	34	(100%)	160	(100%)	$61	(100%)

* Does not include residential garage reported as separate property.

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Area of Origin reported as unknown or blank.

Source: NFIRS and NFPA survey.

Table 3.6. Non-Home Structure Fires Starting With Ignition of LP-Gas, 2007-2011 Annual Averages, by Major Property Use Group

Property Use Group	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Public assembly	240	(23%)	0	(0%)	15	(19%)	$6	(20%)
Residential	240	(22%)	1	(10%)	12	(16%)	$3	(9%)
Outside or special property	220	(20%)	1	(9%)	19	(25%)	$2	(7%)
Stores and offices	120	(11%)	3	(35%)	15	(19%)	$5	(16%)
Storage	100	(9%)	3	(34%)	11	(14%)	$4	(15%)
Unclassified	30	(3%)	0	(0%)	1	(1%)	$0	(0%)
Educational	30	(2%)	0	(0%)	1	(1%)	$0	(0%)
Industrial, utility, defense, agriculture, or mining	30	(2%)	1	(12%)	3	(4%)	$4	(14%)
Health care or correction	20	(2%)	0	(0%)	0	(0%)	$0	(0%)
Manufacturing	20	(2%)	0	(0%)	1	(1%)	$5	(17%)
None or undetermined	40	(4%)	0	(0%)	0	(0%)	$1	(2%)
Total	1,090	(100%)	8	(100%)	76	(100%)	$29	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars.

Source: NFIRS and NFPA survey.

Table 3-7. Non-Home Structure Fires Starting With Ignition of LP-Gas, by Year

Year	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions) as Reported	in 2011 Dollars
1980	1,320	14	88	$24	$66
1981	1,460	0	126	$22	$54
1982	1,440	4	124	$26	$61
1983	1,320	10	337	$73	$164
1984	1,300	7	186	$18	$40
1985	1,310	0	141	$28	$58
1986	1,030	5	110	$27	$55
1987	950	0	84	$17	$33
1988	1,080	0	135	$23	$44
1989	900	11	79	$9	$17
1990	860	11	136	$16	$27
1991	780	4	69	$23	$38
1992	840	0	57	$31	$50
1993	820	3	82	$18	$28
1994	830	4	89	$18	$28
1995	680	14	45	$22	$32
1996	850	0	87	$20	$28
1997	690	2	71	$39	$54
1998	680	3	46	$40	$55
1999	2,160	0	155	$5	$7
2000	940	0	179	$14	$19
2001	1,400	0	87	$40	$51
2002	950	22	63	$34	$43
2003	1,410	0	36	$31	$38
2004	1,530	10	55	$19	$23
2005	920	2	109	$25	$29
2006	1,110	10	69	$7	$8
2007	970	14	78	$45	$48
2008	1,110	7	42	$31	$33
2009	1,060	6	116	$21	$22
2010	910	3	72	$23	$24
2011	1,350	12	77	$26	$26

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Also, because participation in NFIRS Version 5.0 was low in the early years (1999-2001), those estimates are especially volatile. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars.

Source: NFIRS and NFPA survey. Inflation adjustments based on consumer price index.

Table 3.8. Non-Home Structure Fires Starting With Ignition of LP-Gas, 2007-2011 Annual Averages, by Heat Source

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Spark, ember or flame from operating equipment	340	(31%)	0	(0%)	28	(36%)	$8	(29%)
Unclassified heat source	160	(15%)	0	(0%)	2	(3%)	$2	(7%)
Flame or torch used for lighting	120	(11%)	1	(16%)	6	(8%)	$1	(3%)
Unclassified heat from powered equipment	100	(9%)	0	(0%)	2	(2%)	$3	(10%)
Cigarette lighter	70	(6%)	0	(0%)	16	(21%)	$0	(2%)
Radiated or conducted heat from operating equipment	60	(5%)	2	(21%)	2	(2%)	$2	(7%)
Match	50	(4%)	2	(24%)	7	(9%)	$0	(1%)
Heat from direct flame or convection currents	40	(4%)	2	(24%)	3	(4%)	$1	(3%)
Unclassified hot or smoldering object	30	(3%)	0	(0%)	0	(0%)	$0	(1%)
Arcing	20	(2%)	0	(0%)	4	(5%)	$1	(4%)
Unclassified heat spread from another fire	20	(2%)	0	(0%)	0	(0%)	$0	(0%)
Smoking material	10	(1%)	0	(0%)	2	(3%)	$2	(7%)
Heat or spark from friction	10	(1%)	0	(0%)	0	(0%)	$0	(1%)
Molten or hot material	10	(1%)	0	(0%)	0	(0%)	$2	(8%)
Unclassified chemical or natural heat source	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Lightning	10	(1%)	0	(0%)	0	(0%)	$4	(13%)
Radiated heat from another fire	10	(1%)	1	(15%)	0	(0%)	$0	(0%)
Other known heat source	20	(2%)	0	(0%)	5	(7%)	$1	(4%)
Total	1,090	(100%)	8	(100%)	76	(100%)	$29	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. Separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Heat Source reported as unknown or blank. Estimates for smoking material, match, lighter, candle, and other open flame sources include proportional shares of fires reported with Heat Source as "other" heat from open flame or smoking materials.

Source: NFIRS and NFPA survey.

Table 3.9. Non-Home Structure Fires Starting With Ignition of LP-Gas, 2007-2011 Annual Averages, by Equipment Involved in Ignition

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Grill	260	(24%)	0	(0%)	4	(6%)	$1	(3%)
Portable or stationary space heater	210	(19%)	8	(100%)	17	(23%)	$5	(19%)
Range with or without oven	160	(14%)	0	(0%)	13	(17%)	$1	(2%)
No equipment involved	120	(11%)	0	(0%)	9	(12%)	$1	(3%)
Oven or rotisserie	60	(5%)	0	(0%)	2	(3%)	$1	(3%)
Central heating unit	50	(5%)	0	(0%)	3	(4%)	$2	(8%)
Water heater	40	(4%)	0	(0%)	5	(6%)	$0	(1%)
Deep fryer	30	(3%)	0	(0%)	10	(13%)	$0	(0%)
Unclassified equipment involved in ignition	30	(3%)	0	(0%)	0	(0%)	$0	(1%)
Torch, burner or soldering equipment	30	(2%)	0	(0%)	0	(0%)	$0	(1%)
Portable cooking or warming device	20	(2%)	0	(0%)	5	(7%)	$0	(1%)
Swimming pool equipment	10	(1%)	0	(0%)	2	(3%)	$0	(0%)
Hoist or lift	10	(1%)	0	(0%)	0	(0%)	$2	(6%)
Refrigerator or refrigerator/freezer	10	(1%)	0	(0%)	0	(0%)	$0	(1%)
Lawn equipment	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Washer or dryer	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Other known equipment	30	(3%)	0	(0%)	5	(6%)	$15	(51%)
Total	1,090	(100%)	8	(100%)	76	(100%)	$29	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Equipment Involved in Ignition reported as unknown or blank. Reports of no equipment involved are treated as unknown equipment unless Heat Source is coded as 40-99, indicating a known non-equipment Heat Source. Also, equipment reported with a code ending in two zeros is treated as a partial unknown and proportionally allocated (e.g., unclassified or unknown type cooking equipment).

Source: NFIRS and NFPA survey.

Table 3-10. Non-Home Structure Fires Starting With Ignition of LP-Gas, 2007-2011 Annual Averages, by Factor Contributing to Ignition

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Leak or break	390	(36%)	1	(15%)	24	(31%)	$9	(32%)
Unclassified mechanical failure or malfunction	160	(15%)	0	(0%)	6	(8%)	$3	(10%)
Heat source too close to combustibles	90	(8%)	2	(21%)	5	(7%)	$4	(15%)
Unclassified misuse of material or product	50	(5%)	1	(16%)	3	(4%)	$1	(4%)
Unclassified factor contributed to ignition	50	(4%)	0	(0%)	7	(9%)	$2	(6%)
Flammable liquid or gas spilled	40	(4%)	4	(47%)	11	(15%)	$2	(5%)
Equipment unattended	40	(3%)	0	(0%)	0	(0%)	$1	(4%)
Worn out	30	(3%)	0	(0%)	0	(0%)	$0	(0%)
Automatic control failure	30	(3%)	0	(0%)	1	(1%)	$0	(1%)
Abandoned or discarded material	30	(2%)	0	(0%)	0	(0%)	$0	(0%)
Failure to clean	30	(2%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified operational deficiency	30	(2%)	0	(0%)	3	(4%)	$0	(2%)
Manual control failure	20	(2%)	0	(0%)	1	(1%)	$0	(1%)
Equipment not being operated properly	20	(2%)	1	(16%)	3	(5%)	$0	(1%)
Unintentionally turned on or not turned off	20	(2%)	0	(0%)	5	(7%)	$0	(2%)
Improper startup	20	(2%)	0	(0%)	3	(3%)	$0	(0%)
Improper container or storage	20	(2%)	0	(0%)	1	(2%)	$0	(0%)
Unclassified fire spread or control	20	(1%)	0	(0%)	0	(0%)	$0	(0%)
Improper fueling technique	10	(1%)	0	(0%)	1	(2%)	$0	(0%)
Storm	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified electrical failure or malfunction	10	(1%)	0	(0%)	0	(0%)	$4	(15%)
Outside or open fire for warming or cooking	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Installation deficiency	10	(1%)	0	(0%)	4	(6%)	$1	(3%)
Flammable liquid used to kindle fire	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Equipment overloaded	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified natural condition	10	(1%)	0	(0%)	0	(0%)	$4	(15%)
Exposure fire	10	(1%)	1	(16%)	1	(1%)	$0	(1%)

Table 3-10. Non-Home Structure Fires Starting With Ignition of LP-Gas, 2007-2011 Annual Averages, by Factor Contributing to Ignition

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Collision, knock down, or turn over	10	(1%)	0	(0%)	1	(2%)	$0	(1%)
Other known factor	30	(3%)	0	(0%)	7	(10%)	$1	(4%)
Total	1,090	(100%)	8	(100%)	76	(100%)	$29	(100%)
Total factors	1,180	(109%)	11	(131%)	88	(116%)	$35	(121%)
All electrical failures or malfunctions	20	(2%)	0	(0%)	0	(0%)	$5	(16%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Factor Contributing to Ignition reported as none, unknown or blank.

Source: NFIRS and NFPA survey.

Table 3-11. Non-Home Structure Fires Starting With Ignition of LP-Gas, 2007-2011 Annual Averages, by Area of Origin

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Kitchen	370	(34%)	0	(0%)	26	(34%)	$5	(16%)
Unclassified outside area	100	(10%)	0	(0%)	5	(6%)	$0	(0%)
Courtyard, terrace or patio	60	(6%)	0	(0%)	2	(3%)	$0	(0%)
Heating equipment room	50	(4%)	0	(0%)	0	(0%)	$1	(4%)
Unclassified area of origin	40	(3%)	1	(8%)	1	(1%)	$0	(1%)
Garage*	40	(3%)	0	(0%)	4	(5%)	$3	(9%)
Unclassified equipment or service area	30	(3%)	0	(0%)	3	(4%)	$0	(1%)
Exterior balcony or unenclosed porch	30	(2%)	0	(0%)	0	(0%)	$0	(1%)
Unclassified storage area	20	(2%)	1	(7%)	3	(4%)	$2	(6%)
Storage of supplies or tools	20	(2%)	1	(11%)	2	(2%)	$1	(2%)
Unclassified structural area	20	(2%)	1	(13%)	1	(1%)	$0	(1%)
Processing or manufacturing area or workroom	20	(2%)	1	(7%)	2	(2%)	$5	(16%)
Unclassified function area	20	(2%)	0	(0%)	4	(5%)	$0	(1%)
Crawl space or substructure space	20	(1%)	0	(0%)	0	(0%)	$0	(0%)
Lawn, field or open area	10	(1%)	0	(0%)	1	(2%)	$0	(0%)
Storage room, area, tank, or bin	10	(1%)	0	(0%)	1	(2%)	$0	(2%)
Maintenance or paint shop or area	10	(1%)	0	(0%)	2	(3%)	$0	(1%)
Shipping, receiving or loading area	10	(1%)	2	(19%)	1	(2%)	$2	(5%)
Laundry room or area	10	(1%)	0	(0%)	2	(2%)	$0	(1%)
Living room, family room, lounge or den	10	(1%)	0	(0%)	4	(5%)	$0	(0%)
Fuel tank or fuel line of vehicle	10	(1%)	0	(0%)	1	(1%)	$0	(0%)
Exterior wall surface	10	(1%)	0	(0%)	0	(0%)	$0	(1%)
Office	10	(1%)	0	(0%)	1	(1%)	$0	(1%)
Unclassified vehicle area	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Construction or renovation area	10	(1%)	0	(0%)	1	(1%)	$0	(1%)

Table 3-11. Non-Home Structure Fires Starting With Ignition of LP-Gas, 2007-2011 Annual Averages, by Area of Origin (Continued)

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Conduit, pipe, utility, or ventilation shaft	10	(1%)	0	(0%)	0	(0%)	$3	(9%)
Machinery room or area	10	(1%)	0	(0%)	0	(0%)	$1	(2%)
Unclassified assembly or sales area	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Bedroom	10	(1%)	0	(0%)	1	(1%)	$0	(0%)
Lobby or entrance way	10	(1%)	0	(0%)	0	(0%)	$1	(2%)
Small assembly area for less than 100 people	10	(1%)	0	(0%)	1	(1%)	$0	(1%)
Laboratory	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Wall assembly or concealed space	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Exterior stairway, ramp, or fire escape	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Swimming pool	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Incinerator room or area	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Other known area of origin**	60	(6%)	3	(35%)	11	(14%)	$4	(13%)
Total	1,090	(100%)	8	(100%)	76	(100%)	$29	(100%)

* May not include or be limited to garages coded under property use.

** Leading area for deaths not shown above is passenger area of vehicle (35%).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Heat Source reported as unknown or blank. Estimates include proportional shares of fires with Area of Origin reported as unknown or blank.

Source: NFIRS and NFPA survey.

Section 4. Flammable or Combustible Liquid

Flammable and combustible liquids are recorded under Type of Material First Ignited and are grouped on the basis of flash point by the National Fire Incident Reporting System (NFIRS). Flammable liquids have a flash point less than 100ºF:

- Class IA flammable liquid (flash point less than 73ºF and boiling point less than 100ºF), including ethyl ether and pentane;
- Class IB flammable liquid (flash point less than 73ºF and boiling point at or above 100ºF), including acetone, ethyl alcohol, and methyl ethyl ketone;
- Gasoline; and
- Class IC flammable liquid (flash point at or above 73º and below 100ºF), including butyl alcohol, propyl alcohol, and turpentine.
- Many industrial solvents are Class IB or Class IC flammable liquids.

Combustible liquids have a flash point at or above 100ºF:

- Class II combustible liquid (flash point at or above 100ºF but less than 140ºF), including kerosene, diesel fuel, paint thinner, and Nos. 1 and 2 fuel oil (Nos. 1 and 2 fuel oil are the principal types of home heating oil);
- Class IIIA combustible liquid (flash point at or above 140ºF but less than 200ºF), including Nos. 4, 5 and 6 fuel oil, cottonseed oil, and creosote oil (Nos. 4 and 5 are the principal types of commercial and industrial heating oils); and
- Class IIIB combustible liquid (flash point at or above 200ºF), including cooking oil, transformer oil, and lubricating oil.
- Depending on location (region) and time of year, any fuel oil may fall into any class of combustible liquid.

There is a category for "other" flammable or combustible liquid, but considering that the specified categories include all possible flash point values, this is probably unknown-type flammable or combustible liquid.

During 2007-2011, an average of 160,910 fires per year were reported as having begun with the ignition of flammable or combustible liquid as the type of material first ignited. These fires caused an average of 454 civilian deaths per year, 3,910 civilian injuries per year, and $1,544 million in direct property damage per year.

Tables 4-A.1, 4-A.2, and 4-A.3 show how these fires divide, first into fires at homes versus any other property use, and within those two groups, into structure, vehicle, and outdoor or other fires. Nearly all home losses are in structure fires, but one-fifth of the fires are not in structure fires. Vehicle fires are a much larger share of non-home fires than home fires.

Data Sources, Definitions and Conventions Used in This Section

Unless otherwise specified, the statistics in this analysis are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to federal or state agencies or industrial fire brigades. These estimates are projections based on the detailed information collected in Version 5.0 of the U.S. Fire Administration's National Fire Incident Reporting System (NFIRS 5.0) and the National Fire Protection Association's (NFPA's) annual fire department experience survey. In general, any fire that occurs in or on a structure is considered a structure fire, even if the fire was limited to contents and the building itself was not damaged.

"Home" includes one- and two-family homes, manufactured homes, and multi-family housing, including apartments.

Flammable and combustible liquids are identified in NFIRS 5.0 Type of Material First Ignited:
20 – Unclassified or unknown type flammable or combustible liquid. Corresponds to codes 20 (unknown) and 29 (unclassified) in earlier versions of NFIRS.
21 – Class IA flammable liquid, including ethyl ether and pentane.
22 – Class IB flammable liquid, including acetone, ethyl alcohol, and methyl-ethyl-ketone.
23 – Gasoline.
24 – Class IC flammable liquid, including turpentine and butyl alcohol.
25 –.Class II combustible liquid, including kerosene, diesel, paint thinner, and Nos. 1 and 2 fuel oil. No. 2 fuel oil includes the once separate category of No. 3 fuel oil.
26 – Class IIIA combustible liquid, including cottonseed oil, creosote oil, and Nos. 4, 5 and 6 fuel oil. Creosote oil is primarily introduced into buildings when wood burns incompletely.
27 – Class IIIB combustible liquid, including cooking oil, transformer oil, and lubricating oil.
28 – Ethanol, added in 2008.

NFIRS 5.0 includes a category of structure fires collectively referred to as "confined fires," identified by incident type. These include confined cooking fires, confined chimney or flue fires, confined trash fires, confined fuel burner or boiler fires, confined commercial compactor fires, and confined incinerator fires (incident type 113-118). Losses are generally minimal in these fires, which by definition, are assumed to have been limited to the object of origin. Although detailed data is not required for these fires, it is sometimes present.

Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Property damage has not been adjusted for inflation. Fires are rounded to the nearest ten, civilian deaths and injuries to the nearest one, and direct property damage to the nearest million. Additional details on the methodology may be found in Appendix A.

Reporting of Type of Material First Ignited is not required if Item First Ignited is coded in the range of 70 to 99. As with confined fires, the field is nevertheless reported for many fires, but the percentage of unknowns and blanks is higher. Fires are analyzed separately for (1) non-confined structure fires, (2) confined structure fires, (3) vehicle fires, (4) outdoor or other vegetation fires, and (5) outdoor or other non-vegetation fires (principally trash). For each of these, fires are analyzed separately for Item First Ignited 70-99 and Item First Ignited not 70-99.

Table 4-A.1. Fires Starting With Ignition of Flammable or Combustible Liquid
2007-2011 Annual Averages, by Property Use

Property Use	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Home	55,390	(34%)	202	(44%)	2,708	(69%)	$490	(32%)
Non-home	105,520	(66%)	252	(56%)	1,202	(31%)	$1,054	(68%)
Total	160,910	(100%)	454	(100%)	3,910	(100%)	$1,544	(100%)

Note: See text box on p. 68 for details on calculation. Source: NFIRS and NFPA survey.

Table 4-A.2. Home Fires Starting With Ignition of Flammable or Combustible Liquid
2007-2011 Annual Averages, by Incident Type

Property Use	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Structure fire	43,620	(79%)	196	(97%)	2,559	(95%)	$469	(96%)
Vehicle fire	4,000	(7%)	4	(2%)	79	(3%)	$16	(3%)
Outdoor or other fire	7,770	(14%)	2	(1%)	70	(3%)	$5	(1%)
Total	55,390	(100%)	202	(100%)	2,708	(100%)	$490	(100%)

Note: See text box for details on calculation. Source: NFIRS and NFPA survey.

Table 4-A.3. Non-Home Fires Starting With Ignition of Flammable or Combustible Liquid
2007-2011 Annual Averages, by Incident Type

Property Use	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Structure fire	11,710	(11%)	34	(14%)	458	(38%)	$374	(35%)
Vehicle fire	68,390	(65%)	207	(82%)	641	(53%)	$434	(46%)
Outdoor or other fire	25,420	(24%)	11	(4%)	103	(9%)	$196	(19%)
Total	105,520	(100%)	252	(100%)	1,202	(100%)	$1,054	(100%)

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

Class IIIB combustible liquid accounts for the largest share of structure fires starting with ignition of any flammable or combustible liquid.

Tables 4-B.1 to 4-B.4 list all fires, structure fires, home structure fires, and non-home structure fires, respectively, in order of type of flammable or combustible liquid first involved in ignition. The other three leading liquids are Class II combustible liquids, unclassified or unknown-type liquids, and gasoline. Class II combustible liquids rank higher for home fires, probably because home heating fuel oils are more likely to be Class II combustible liquids while non-home heating fuel oils are more likely to be Class IIIA combustible liquids. Gasoline ranks first for all fires (38%), primarily because of its involvement in vehicle fires.

Table 4-B.1. Fires Starting With Ignition of Flammable or Combustible Liquid
2007-2011 Annual Averages, by Type of Liquid

Type of Liquid	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Gasoline	60,650	(38%)	277	(61%)	1,125	(29%)	$457	(30%)
Class IIIB combustible liquid	47,430	(29%)	28	(6%)	2,012	(51%)	$370	(24%)
Unclassified or unknown-type liquid	36,490	(23%)	102	(22%)	525	(13%)	$506	(33%)
Class II combustible liquid	12,730	(8%)	31	(7%)	139	(4%)	$110	(7%)
Class IIIA combustible liquid	1,650	(1%)	0	(0%)	3	(0%)	$7	(0%)
Class IA flammable liquid	840	(1%)	2	(1%)	23	(1%)	$12	(1%)
Class IC flammable liquid	700	(0%)	2	(0%)	46	(1%)	$13	(1%)
Class IB flammable liquid	260	(0%)	11	(3%)	15	(0%)	$56	(4%)
Ethanol	160	(0%)	0	(0%)	21	(1%)	$14	(1%)
Total	160,910	(100%)	455	(100%)	3,910	(100%)	$1,545	(100%)

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

Table 4-B.2. Structure Fires Starting With Ignition of Flammable or Combustible Liquid
2007-2011 Annual Averages, by Type of Liquid

Type of Liquid	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Class IIIB combustible liquid	33,740	(61%)	28	(12%)	1,972	(65%)	$283	(34%)
Class II combustible liquid	8,420	(15%)	12	(5%)	108	(4%)	$25	(3%)
Unclassified or unknown-type liquid	7,220	(13%)	64	(28%)	375	(12%)	$276	(33%)
Gasoline	4,190	(8%)	122	(53%)	482	(16%)	$227	(27%)
Class IIIA combustible liquid	1,290	(2%)	0	(0%)	3	(0%)	$4	(0%)
Class IC flammable liquid	270	(0%)	2	(1%)	39	(1%)	$12	(1%)
Class IA flammable liquid	140	(0%)	1	(1%)	15	(0%)	$11	(1%)
Class IB flammable liquid	40	(0%)	1	(0%)	6	(0%)	$2	(0%)
Ethanol	30	(0%)	0	(0%)	18	(1%)	$3	(0%)
Total	55,330	(100%)	231	(100%)	3,018	(100%)	$842	(100%)

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

Table 4-B.3. Fires Starting With Ignition of Flammable or Combustible Liquid
2007-2011 Annual Averages, by Type of Liquid

Type of Liquid	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Class III B combustible liquid	28,180	(65%)	27	(14%)	1,838	(72%)	$222	(47%)
Class II combustible liquid	6,890	(16%)	10	(5%)	93	(4%)	$14	(3%)
Unclassified or unknown-type liquid	4,710	(11%)	55	(28%)	256	(10%)	$97	(21%)
Gasoline	2,410	(6%)	101	(52%)	325	(13%)	$125	(27%)
Class IIIA combustible liquid	1,140	(3%)	0	(0%)	2	(0%)	$2	(0%)
Class IC flammable liquid	170	(0%)	2	(1%)	30	(1%)	$6	(1%)
Class IA flammable liquid	90	(0%)	0	(0%)	11	(0%)	$1	(0%)
Class IB flammable liquid	20	(0%)	1	(1%)	4	(0%)	$1	(0%)
Ethanol	10	(0%)	0	(0%)	0	(0%)	$0	(0%)
Total	43,620	(100%)	196	(100%)	2,559	(100%)	$469	(100%)

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

Table 4-B.4. Non-Home Structure Fires Starting With Ignition of Flammable or Combustible Liquid
2007-2011 Annual Averages, by Type of Liquid

Type of Liquid	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Class IIIB combustible liquid	5,560	(47%)	1	(2%)	134	(29%)	$60	(16%)
Unclassified or unknown-type liquid	2,510	(21%)	9	(27%)	119	(26%)	$179	(48%)
Gasoline	1,790	(15%)	21	(61%)	157	(34%)	$102	(27%)
Class II combustible liquid	1,530	(13%)	2	(6%)	15	(3%)	$12	(3%)
Class IIIA combustible liquid	150	(1%)	0	(0%)	1	(0%)	$1	(0%)
Class IC flammable liquid	100	(1%)	0	(0%)	9	(2%)	$6	(2%)
Class IA flammable liquid	50	(0%)	1	(4%)	3	(1%)	$9	(3%)
Class IB flammable liquid	20	(0%)	0	(0%)	2	(0%)	$2	(0%)
Ethanol	20	(0%)	0	(0%)	18	(4%)	$3	(1%)
Total	11,710	(100%)	34	(100%)	458	(100%)	$374	(100%)

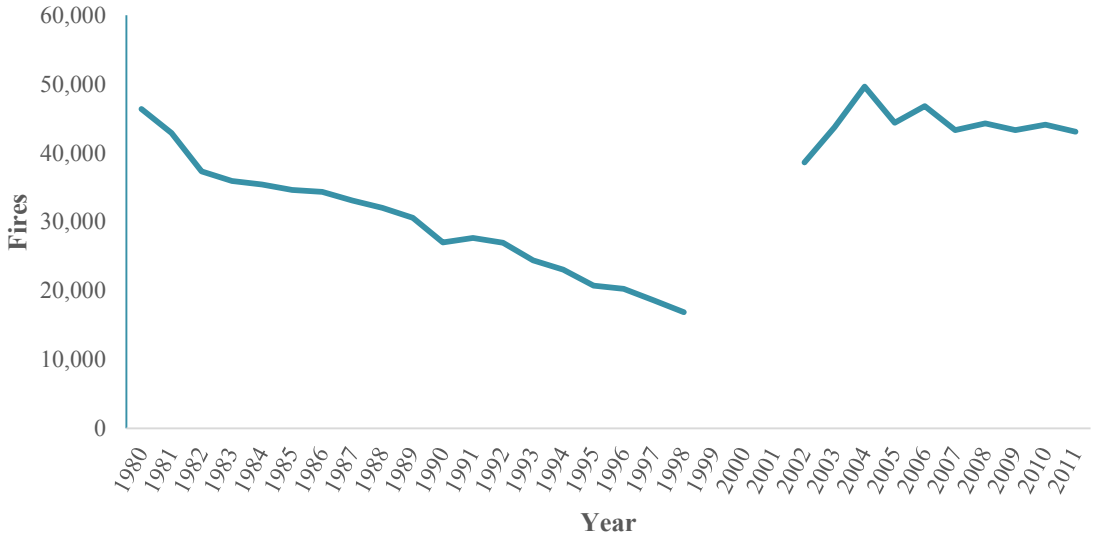
Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

Risk comparisons are not possible because the two principal alternative home heating and cooking liquid fuels – fuel oil and kerosene – are both Class II combustible liquids and so are not distinguished in fire reporting.

A. Homes

Flammable or combustible liquid home structure fires declined substantially from 1980 to 1998 but have shown a level trend in recent years.
Table 4-1 and Figure 4-1 show the trends in home fires starting with ignition of flammable or combustible liquids, from 1980 to 2011. Fires dropped by more than half from 1980 to 1998, then jumped to the levels of the early 1980s when NFIRS Version 5.0 was introduced. More recently, the trend has been mostly level.

Figure 4-1. Home Structure Fires Starting With Ignition of Flammable or Combustible Liquid



Note: See Note on Table 4-1. Source: NFIRS and NFPA survey.

Most home structure fires starting with ignition of flammable or combustible liquid involve cooking or heating equipment as the heat source.
Table 4-2 shows that the three leading heat sources, accounting for three out of five of the fires, involve equipment. Table 4-3 shows that cooking and heating equipment are the types of equipment involved for most home flammable or combustible liquid fires when equipment is involved.

Note that when equipment ignites a liquid, the liquid ignited may not have been in use, as fuel or in any other way, by the equipment that ignited the liquid. In fact, pilot lights for equipment that is not turned on can serve as a heat source for the vapors released by liquid spilled, leaking, or otherwise released anywhere near the pilot light, as can hot surfaces from any operating equipment near the released liquid.

One-fourth (24%) of home structure fires starting with ignition of a flammable or combustible liquid involved unattended equipment as a factor contributing to ignition.
Table 4-4 shows the leading factors contributing to ignition. Some other leading factors also point to behaviors that could be made safer, including misuse of the liquid, abandoned or discarded material (including heat sources, like lit cigarettes), failure to clean spills or equipment, and insufficient separation between heat source and combustible. Intentional fires accounted for 6% of home flammable or combustible liquid structure fires.

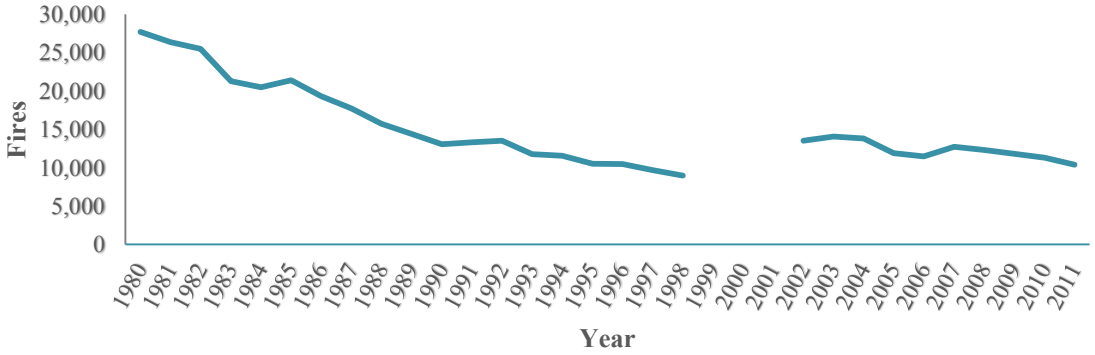
Two-thirds (65%) of home structure fires starting with ignition of a flammable or combustible liquid began in the kitchen.
This is consistent with the large role of cooking equipment as heat sources in these fires. Table 4-5 shows the leading areas of origin. The second leading area is heating equipment room or area, which is consistent with the large role of heating equipment as a heat source second only to cooking equipment.

B. Properties Other Than Homes

Three out of five (60%) non-home structure fires starting with ignition of a flammable or combustible liquid occur at public assembly (23%), store or office (20%), or residential (17%) properties.
Many of these places feature commercial cooking as an activity, which makes it possible that the significant role of cooking equipment as heat sources for home flammable or combustible liquid fires may be repeated in non-home properties. Table 4-6 shows the shares of these fires by major property use group.

Flammable or combustible liquid non-home structure fires declined substantially from 1980 to 1998 and have shown a slightly declining trend in recent years.
Table 4-7 and Figure 4-2 show the trends in non-home fire, starting with ignition of flammable or combustible liquids, from 1980 to 2011. Fires dropped by two-thirds from 1980 to 1998, then jumped to the levels of the early to mid-1990s when NFIRS Version 5.0 was introduced. More recently, the trend has been slightly declining.

Figure 4-2. Non-Home Structure Fires Starting With Ignition of Flammable or Combustible Liquid



Note: See Note on Table 4-7. Source: NFIRS and NFPA survey.

Most non-home structure fires starting with ignition of a flammable or combustible liquid involve cooking or heating equipment as the heat source.
Table 4-8 shows that the three leading heat sources, accounting for more than half the fires, involve equipment. Table 4-9 shows that cooking and heating equipment are the types of equipment involved for most non-home flammable or combustible liquid fires when equipment is involved. Torches, burners, and soldering equipment, with 3% of non-home flammable or combustible liquid structure fires, had the largest equipment share for any equipment other than cooking and heating equipment, although the burners reported here could include burners on a stovetop. Note that on Table 4.8, a different kind of torch, used for lighting, also accounted for 3% of these fires.

Note that when equipment ignites a flammable or combustible liquid, the liquid ignited may not have been in use, as fuel or in any other way, by the equipment that ignited the liquid. In fact, pilot lights for equipment that is not turned on can serve as a heat source for vapors from liquid spilled, leaking or otherwise released anywhere near the pilot light, as can hot surfaces from any operating equipment near the released liquid.

Non-home structure fires starting with ignition of a flammable or combustible liquid show many different leading factors contributing to ignition, with unclassified mechanical failure or malfunction having the largest share (15% of fires).
Table 4-10 shows the leading factors contributing to ignition, most of which are consistent with equipment as the heat source. Some of the leading factors point to behaviors that could be made safer, including failure to clean spills or equipment, spills, leaving equipment unattended, and separation between heat source and combustible. Intentional fires accounted for 11% of non-home flammable or combustible liquid structure fires.

Two out of five (41%) non-home structure fires starting with ignition of a flammable or combustible liquid began in a kitchen.
This is consistent with the large role of cooking equipment as heat sources in these fires. Table 4-11 shows the leading areas or origin. The second leading area is heating equipment room or area, which is consistent with the large role of heating equipment as a heat source second only to cooking equipment.

Table 4-1. Home Structure Fires Starting With Ignition of Flammable or Combustible Liquid, by Year

Year	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions) as Reported	in 2011 Dollars
1980	46,370	437	2,786	$263	$717
1981	42,900	497	2,713	$290	$716
1982	37,340	450	2,964	$235	$547
1983	35,930	505	2,970	$296	$666
1984	35,430	282	2,669	$295	$638
1985	34,600	436	2,609	$291	$608
1986	34,320	383	2,620	$302	$619
1987	33,090	386	2,594	$283	$560
1988	32,040	423	2,854	$325	$617
1989	30,580	445	2,542	$317	$576
1990	27,010	337	2,348	$322	$554
1991	27,670	389	2,412	$420	$693
1992	26,950	304	2,308	$287	$459
1993	24,410	385	2,165	$295	$459
1994	23,060	254	1,769	$257	$390
1995	20,740	258	1,686	$248	$366
1996	20,250	283	1,720	$281	$403
1997	18,600	277	1,496	$219	$306
1998	16,870	160	1,471	$217	$299
1999	25,840	207	1,926	$250	$337
2000	29,840	125	2,643	$284	$370
2001	38,460	76	2,488	$316	$401
2002	38,630	155	2,113	$341	$426
2003	43,750	186	2,369	$367	$448
2004	49,610	292	2,429	$346	$411
2005	44,390	247	2,406	$441	$507
2006	46,820	157	2,339	$440	$491
2007	43,300	257	2,602	$445	$482
2008	44,310	223	2,439	$496	$518
2009	43,290	172	2,513	$480	$503
2010	44,090	184	2,687	$461	$476
2011	43,100	144	2,599	$463	$463

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Also, because participation in NFIRS Version 5.0 was low in the early years (1999-2001), those estimates are especially volatile. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars.

Source: NFIRS and NFPA survey. Inflation adjustments based on consumer price index.

Table 4-2. Home Structure Fires Starting With Ignition of Flammable or Combustible Liquid, 2007-2011 Annual Averages, by Heat Source

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Unclassified heat from powered equipment	11,230	(26%)	6	(3%)	546	(21%)	$77	(17%)
Radiated or conducted heat from operating equipment	11,010	(25%)	26	(13%)	903	(35%)	$97	(21%)
Spark, ember or flame from operating equipment	4,970	(11%)	20	(10%)	229	(9%)	$50	(11%)
Unclassified heat source	4,910	(11%)	15	(8%)	211	(8%)	$36	(8%)
Unclassified hot or smoldering object	2,770	(6%)	3	(1%)	113	(4%)	$26	(6%)
Heat from direct flame or convection currents	1,460	(3%)	2	(1%)	72	(3%)	$14	(3%)
Match	1,090	(2%)	45	(23%)	49	(2%)	$29	(6%)
Cigarette lighter	1,060	(2%)	45	(23%)	143	(6%)	$45	(10%)
Backfire from internal combustion engine	810	(2%)	0	(0%)	2	(0%)	$5	(1%)
Molten or hot material	800	(2%)	0	(0%)	60	(2%)	$8	(2%)
Hot ember or ash	570	(1%)	4	(2%)	12	(0%)	$3	(1%)
Flame or torch used for lighting	530	(1%)	5	(3%)	33	(1%)	$14	(3%)
Smoking material	380	(1%)	3	(2%)	30	(1%)	$8	(2%)
Incendiary device	350	(1%)	4	(2%)	3	(0%)	$8	(2%)
Arcing	340	(1%)	1	(1%)	34	(1%)	$8	(2%)
Candle	230	(1%)	2	(1%)	45	(2%)	$4	(1%)
Other known heat source*	1,120	(3%)	16	(8%)	74	(3%)	$34	(7%)
Total	43,620	(100%)	196	(100%)	2,559	(100%)	$469	(100%)

* Leading heat sources for deaths not shown above are multiple heat sources (6% of deaths) and unclassified chemical or natural heat source (2%).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. Separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Also, because participation in NFIRS Version 5.0 was low in the early years (1999-2001), those estimates are especially volatile. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Heat Source reported as unknown or blank. Estimates for smoking material, match, lighter, candle, and other open flame sources include proportional shares of fires reported with Heat Source as "other" heat from open flame or smoking material.

Source: NFIRS and NFPA survey.

Table 4-3. Home Structure Fires Starting With Ignition of Flammable or Combustible Liquid, 2007-2011 Annual Averages, by Equipment Involved in Ignition

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Range with or without oven	17,790	(41%)	33	(17%)	1,374	(54%)	$156	(33%)
No equipment involved	7,020	(16%)	98	(50%)	421	(16%)	$165	(35%)
Portable or stationary space heater	6,460	(15%)	20	(10%)	347	(14%)	$39	(8%)
Central heating unit	5,690	(13%)	11	(6%)	25	(1%)	$6	(1%)
Oven or rotisserie	2,430	(6%)	0	(0%)	21	(1%)	$7	(1%)
Portable cooking or warming device	1,020	(2%)	0	(0%)	51	(2%)	$12	(2%)
Deep fryer	610	(1%)	0	(0%)	10	(0%)	$8	(2%)
Water heater	600	(1%)	18	(9%)	100	(4%)	$26	(5%)
Microwave oven	290	(1%)	0	(0%)	19	(1%)	$0	(0%)
Fireplace, chimney or connector	290	(1%)	0	(0%)	13	(1%)	$4	(1%)
Other known equipment*	1,410	(3%)	16	(8%)	178	(7%)	$47	(10%)
Total	43,620	(100%)	196	(100%)	2,559	(100%)	$469	(100%)

* Leading equipment for deaths not shown above is transformer or power supply (4% of deaths).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Heat Source reported as unknown or blank. Estimates include proportional shares of fires with Equipment Involved in Ignition reported or unknown equipment unless Heat Source is coded as 40-99, indicating a known non-equipment Heat Source. Also equipment reported with a code of x zeros is tested as a partial unknown and proportionally allocated (e.g, unclassified or unknown type cooking equipment.

Source: NFIRS and NFPA survey.

Table 4-4. Home Structure Fires Starting With Ignition of Flammable or Combustible Liquid, 2007-2011 Annual Averages, by Factor Contributing to Ignition

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Equipment unattended	10,610	(24%)	18	(9%)	814	(32%)	$111	(24%)
Unclassified misuse of material	4,020	(9%)	41	(21%)	345	(13%)	$57	(12%)
Abandoned or discarded material	3,930	(9%)	4	(2%)	204	(8%)	$35	(7%)
Unclassified factor contributed to ignition	3,430	(8%)	43	(22%)	195	(8%)	$48	(10%)
Unclassified mechanical failure or malfunction	3,270	(7%)	1	(1%)	60	(2%)	$13	(3%)
Failure to clean	3,160	(7%)	0	(0%)	19	(1%)	$2	(0%)
Heat source too close to combustibles	2,950	(7%)	10	(5%)	191	(7%)	$36	(8%)
Flammable liquid or gas spilled	2,680	(6%)	47	(24%)	277	(11%)	$61	(13%)
Unintentionally turned on or not turned off	2,140	(5%)	0	(0%)	132	(5%)	$20	(4%)
Automatic control failure	1,220	(3%)	0	(0%)	2	(0%)	$0	(0%)
Backfire	1,060	(2%)	0	(0%)	21	(1%)	$3	(1%)
Flammable liquid used to kindle fire	1,030	(2%)	36	(18%)	72	(3%)	$40	(8%)
Unclassified operational deficiency	1,010	(2%)	1	(0%)	55	(2%)	$9	(2%)
Equipment not being operated properly	730	(2%)	0	(0%)	51	(2%)	$5	(1%)
Improper container or storage	520	(1%)	4	(2%)	38	(1%)	$13	(3%)
Leak or break	460	(1%)	2	(1%)	27	(1%)	$10	(2%)
Unclassified fire spread or control	390	(1%)	1	(0%)	24	(1%)	$6	(1%)
Improper startup	310	(1%)	0	(0%)	18	(1%)	$2	(0%)
Worn out	280	(1%)	2	(1%)	2	(0%)	$1	(0%)
Improper fueling technique	250	(1%)	2	(1%)	35	(1%)	$5	(1%)
Playing with heat source	250	(1%)	3	(1%)	39	(2%)	$3	(1%)
Other known factor	1,630	(4%)	11	(5%)	133	(5%)	$32	(7%)

Table 4-4. Home Structure Fires Starting With Ignition of Flammable or Combustible Liquid, 2007-2011 Annual Averages, by Factor Contributing to Ignition (Continued)

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Total	43,620	(100%)	196	(100%)	2,559	(100%)	$469	(100%)
Total factors	45,350	(104%)	223	(114%)	2,754	(108%)	$511	(109%)
All electrical failures or malfunctions	430	(1%)	2	(1%)	27	(1%)	$8	(2%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Factor Contributing to Ignition reported as none, unknown, or blank.

Source: NFIRS and NFPA survey.

Table 4-5. Home Structure Fires Starting With Ignition of Flammable or Combustible Liquid, 2007-2011 Annual Averages, by Area of Origin

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Kitchen	28,330	(65%)	34	(18%)	1,862	(73%)	$228	(49%)
Heating equipment room	5,680	(13%)	8	(4%)	62	(2%)	$7	(2%)
Unclassified area of origin	1,000	(2%)	1	(0%)	12	(0%)	$2	(1%)
Garage*	800	(2%)	14	(7%)	148	(6%)	$58	(12%)
Living room, family room, or den	750	(2%)	32	(17%)	78	(3%)	$23	(5%)
Unclassified function area	730	(2%)	16	(8%)	45	(2%)	$15	(3%)
Duct for HVAC, cable, heating, or air conditioning	700	(2%)	1	(0%)	4	(0%)	$1	(0%)
Crawl space or substructure space	640	(1%)	6	(3%)	32	(1%)	$6	(1%)
Bedroom	450	(1%)	24	(12%)	77	(3%)	$20	(4%)
Unclassified structural area	450	(1%)	7	(4%)	32	(1%)	$8	(2%)
Unclassified equipment or service area	400	(1%)	0	(0%)	7	(0%)	$0	(0%)
Unclassified outside area	350	(1%)	0	(0%)	7	(0%)	$3	(1%)
Exterior wall surface	320	(1%)	0	(0%)	11	(0%)	$4	(1%)
Exterior balcony or unenclosed porch	300	(1%)	2	(1%)	20	(1%)	$10	(2%)
Multiple areas of origin	270	(1%)	11	(6%)	11	(0%)	$25	(5%)
Courtyard, terrace or patio	250	(1%)	0	(0%)	10	(0%)	$3	(1%)
Other known area of origin **	2,220	(5%)	38	(19%)	141	(5%)	$55	(12%)
Total	43,620	(100%)	196	(100%)	2,559	(100%)	$469	(100%)

* Does not include residential garage coded as separate property.
** Leading areas of origin for deaths not shown above are hallway or corridor (4% of deaths), lobby or entrance way (3%), laundry room or area (3%), interior stairway (2%), and bathroom (2%).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Area of Origin reported as unknown or blank.
Source: NFIRS and NFPA survey.

Table 4-6. Non-Home Structure Fires Starting With Ignition of Flammable or Combustible Liquid, 2007-2011 Annual Averages, by Major Property Use Group

Property Use Group	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Public assembly	2,700	(23%)	2	(5%)	39	(8%)	$33	(9%)
Stores and offices	2,390	(20%)	10	(28%)	107	(23%)	$104	(28%)
Residential	2,030	(17%)	11	(31%)	67	(15%)	$19	(5%)
Storage	1,300	(11%)	9	(25%)	93	(20%)	$52	(14%)
Manufacturing	930	(8%)	0	(0%)	46	(10%)	$99	(26%)
Outside or special property	740	(6%)	0	(0%)	26	(6%)	$6	(2%)
Educational	440	(4%)	0	(0%)	41	(9%)	$9	(2%)
Health care or correction	270	(2%)	0	(0%)	14	(3%)	$3	(1%)
Industrial, utility, defense, agriculture, or mining	270	(2%)	1	(2%)	11	(2%)	$41	(11%)
Unclassified	130	(1%)	0	(0%)	7	(2%)	$3	(1%)
None or undetermined	520	(4%)	3	(10%)	8	(2%)	$6	(2%)
Total	11,710	(100%)	34	(100%)	458	(100%)	$374	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars.

Source: NFIRS and NFPA survey.

Table 4-7. Non-Home Structure Fires Starting With Ignition of Flammable or Combustible Liquid, by Year

Year	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions) as Reported	in 2011 Dollars
1980	27,700	93	1,112	$373	$1,018
1981	26,380	42	1,433	$439	$1,083
1982	25,520	58	1,291	$426	$990
1983	21,280	117	1,338	$343	$773
1984	20,520	77	1,131	$304	$656
1985	21,420	74	903	$446	$930
1986	19,350	96	1,184	$346	$710
1987	17,750	62	896	$371	$734
1988	15,750	83	1,060	$466	$886
1989	14,400	84	775	$1,746	$3,167
1990	13,080	115	822	$316	$544
1991	13,320	34	667	$621	$1,025
1992	13,550	44	612	$450	$720
1993	11,790	48	855	$360	$560
1994	11,590	37	605	$313	$475
1995	10,540	72	562	$316	$466
1996	10,470	78	516	$292	$419
1997	9,700	36	471	$233	$326
1998	8,980	71	492	$192	$264
1999	11,560	42	590	$229	$309
2000	11,610	32	945	$264	$345
2001	13,280	5	484	$377	$479
2002	13,540	16	494	$266	$333
2003	14,060	42	405	$393	$479
2004	13,810	34	423	$240	$286
2005	11,890	21	397	$235	$271
2006	11,490	45	345	$221	$246
2007	12,720	33	409	$336	$364
2008	12,330	50	494	$439	$457
2009	11,840	36	513	$449	$470
2010	11,320	18	485	$336	$346
2011	10,420	36	376	$312	$312

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Also, because participation in NFIRS Version 5.0 was low in the early years (1999-2001), those estimates are especially volatile. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars.

Source: NFIRS and NFPA survey. Inflation adjustments based on consumer price index.

Table 4-8. Non-Home Structure Fire Starting With Ignition of Flammable or Combustible Liquid, 2007-2011 Annual Averages, by Heat Source

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Unclassified heat from powered equipment	2,620	(22%)	1	(2%)	62	(13%)	$53	(14%)
Radiated or conducted heat from operating equipment	1,930	(17%)	1	(3%)	79	(17%)	$30	(8%)
Spark, ember or flame from operating equipment	1,850	(16%)	5	(13%)	83	(18%)	$85	(23%)
Unclassified heat source	1,170	(10%)	3	(10%)	18	(4%)	$19	(5%)
Unclassified hot or smoldering object	560	(5%)	0	(0%)	23	(5%)	$26	(7%)
Cigarette lighter	530	(5%)	7	(20%)	44	(9%)	$35	(9%)
Match	410	(4%)	5	(16%)	9	(2%)	$7	(2%)
Flame or torch used for lighting	340	(3%)	1	(2%)	21	(5%)	$10	(3%)
Heat from direct flame or convection currents	340	(3%)	0	(0%)	14	(3%)	$5	(1%)
Molten or hot material	290	(2%)	0	(0%)	9	(2%)	$9	(3%)
Arcing	280	(2%)	4	(12%)	20	(4%)	$24	(6%)
Heat or spark from friction	190	(2%)	2	(6%)	13	(3%)	$15	(4%)
Backfire from internal combustion engine	180	(2%)	0	(0%)	6	(1%)	$4	(1%)
Incendiary device	160	(1%)	0	(0%)	5	(1%)	$8	(2%)
Chemical reaction	140	(1%)	1	(4%)	7	(1%)	$5	(1%)
Smoking material	130	(1%)	0	(0%)	5	(1%)	$3	(1%)
Hot ember or ash	110	(1%)	0	(0%)	4	(1%)	$1	(0%)
Unclassified chemical or natural heat source	80	(1%)	0	(0%)	2	(0%)	$4	(1%)
Multiple heat sources including multiple ignitions	70	(1%)	5	(13%)	1	(0%)	$7	(2%)
Candle	60	(1%)	0	(0%)	7	(1%)	$1	(0%)
Other known heat source	270	(2%)	0	(0%)	27	(6%)	$23	(6%)
Total	11,710	(100%)	34	(100%)	458	(100%)	$374	(100%)

Table 4-8. Non-Home Structure Fire Starting With Ignition of Flammable or Combustible Liquid, 2007-2011 Annual Averages, by Heat Source (Continued)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Also, because participation in NFIRS Version 5.0 was low in the early years (1999-2001), those estimates are especially volatile. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Heat Source reported as unknown or blank. Estimates for smoking material, match, lighter, candle, and other open flame sources include proportional shares of fires reported with Heat Source as "other" heat from open flame or smoking material.

Source: NFIRS and NFPA survey.

Table 4-9. Non-Home Structure Fires Starting With Ignition of Flammable or Combustible Liquid, 2007-2011 Annual Averages, by Equipment Involved in Ignition

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Deep fryer	2,460	(21%)	0	(0%)	55	(12%)	$15	(4%)
No equipment involved	2,260	(19%)	25	(74%)	138	(30%)	$101	(27%)
Range with or without oven	1,260	(11%)	0	(0%)	61	(13%)	$8	(2%)
Portable or stationary space heater	1,080	(9%)	2	(5%)	26	(6%)	$16	(4%)
Central heating unit	950	(8%)	0	(1%)	12	(3%)	$71	(19%)
Portable cooking or warming device	410	(4%)	0	(0%)	4	(1%)	$1	(0%)
Torch, burner or soldering equipment	390	(3%)	0	(0%)	30	(7%)	$10	(3%)
Grill	310	(3%)	0	(0%)	10	(2%)	$1	(0%)
Oven or rotisserie	220	(2%)	0	(0%)	7	(2%)	$0	(0%)
Water heater	190	(2%)	0	(1%)	2	(0%)	$3	(1%)
Yard equipment including snow blower	180	(2%)	0	(0%)	2	(0%)	$6	(2%)
Generator, battery or other power source	150	(1%)	0	(0%)	7	(2%)	$5	(1%)
Unclassified equipment involved in ignition	150	(1%)	0	(0%)	5	(1%)	$14	(4%)
Heat treating equipment	130	(1%)	0	(0%)	2	(0%)	$9	(2%)
Lamp, light fixture or light bulb	120	(1%)	2	(6%)	31	(7%)	$27	(7%)
Grease hood or duct exhaust fan	120	(1%)	0	(0%)	6	(1%)	$1	(0%)
Unclassified hydraulic equipment	110	(1%)	0	(0%)	3	(1%)	$9	(2%)
Commercial or medical equipment	90	(1%)	0	(0%)	3	(1%)	$1	(0%)
Industrial furnace or kiln	80	(1%)	0	(0%)	0	(0%)	$5	(1%)
Fireplace, chimney or connector	80	(1%)	0	(0%)	0	(0%)	$0	(0%)
Pump	60	(1%)	0	(0%)	7	(1%)	$2	(1%)

Table 4-9. Non-Home Structure Fires Starting With Ignition of Flammable or Combustible Liquid, 2007-2011 Annual Averages, by Equipment Involved in Ignition (Continued)

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Other known equipment*	930	(8%)	4	(12%)	49	(11%)	$71	(19%)
Total	11,710	(100%)	34	(100%)	458	(100%)	$374	(100%)

* Leading equipment for deaths not shown above is charcoal lighter (11% of deaths).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shsares of fires with Equipment Involved in Ignition reported as unknown or blank. Reports of no equipment involved are treated as unknown equipment unless Heat Source is coded as 40-99, indicating a known non-equipment Heat Source. Also, equipment reported with a code ending in two zeros is treated as a partial unknown and proportionally allocated (e.g., unclassified or unknown type cooking equipment).

Source: NFIRS and NFPA survey.

Table 4-10. Non-Home Structure Fires Starting With Ignition of Flammable or Combustible Liquid, 2007-2011 Annual Averages, by Factor Contributing to Ignition

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Unclassified mechanical failure or malfunction	1,800	(15%)	1	(3%)	26	(6%)	$50	(13%)
Failure to clean	1,210	(10%)	0	(0%)	8	(2%)	$8	(2%)
Unclassified misuse of material or product	910	(8%)	2	(7%)	83	(18%)	$36	(10%)
Flammable liquid or gas spilled	900	(8%)	13	(37%)	79	(17%)	$53	(14%)
Equipment unattended	890	(8%)	0	(0%)	29	(6%)	$10	(3%)
Heat source too close to combustibles	810	(7%)	2	(5%)	57	(12%)	$25	(7%)
Unclassified factor contributed to ignition	740	(6%)	8	(23%)	29	(6%)	$30	(8%)
Abandoned or discarded material	460	(4%)	1	(2%)	11	(2%)	$11	(3%)
Leak or break	450	(4%)	0	(0%)	17	(4%)	$28	(8%)
Unclassified operational deficiency	390	(3%)	1	(3%)	14	(3%)	$6	(2%)
Flammable liquid used to kindle fire	380	(3%)	7	(22%)	14	(3%)	$16	(4%)
Unintentionally turned on or not turned off	370	(3%)	0	(0%)	4	(1%)	$3	(1%)
Cutting or welding too close to combustible	300	(3%)	1	(2%)	23	(5%)	$18	(5%)
Backfire	280	(2%)	0	(0%)	4	(1%)	$4	(1%)
Automatic control failure	280	(2%)	0	(0%)	2	(0%)	$2	(1%)
Equipment not being operated properly	240	(2%)	0	(0%)	9	(2%)	$3	(1%)
Improper container or storage	180	(2%)	0	(0%)	12	(3%)	$12	(3%)
Improper startup	170	(1%)	0	(0%)	5	(1%)	$3	(1%)
Unclassified electrical failure or malfunction	160	(1%)	0	(0%)	3	(1%)	$11	(3%)
Exposure fire	140	(1%)	2	(5%)	1	(0%)	$5	(1%)
Playing with heat source	130	(1%)	0	(0%)	9	(2%)	$2	(1%)
Improper fueling technique	120	(1%)	1	(2%)	11	(2%)	$4	(1%)
Collision, knock down, or turn over	110	(1%)	1	(4%)	11	(2%)	$12	(3%)
Worn out	100	(1%)	0	(0%)	0	(0%)	$0	(0%)
Arc or spark from operating equipment	100	(1%)	0	(0%)	14	(3%)	$8	(2%)

Table 4-10. Non-Home Structure Fires Starting With Ignition of Flammable or Combustible Liquid, 2007-2011 Annual Averages, by Factor Contributing to Ignition (Continued)

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Unspecified short circuit arc	100	(1%)	0	(0%)	3	(1%)	$4	(1%)
Unclassified fire spread or control	80	(1%)	1	(3%)	5	(1%)	$2	(0%)
Manual control failure	80	(1%)	0	(0%)	0	(0%)	$1	(0%)
Other known factor	490	(4%)	1	(2%)	18	(4%)	$40	(11%)
Total	11,710	(100%)	34	(100%)	458	(100%)	$374	(100%)
Total factors	12,370	(106%)	42	(121%)	502	(110%)	$409	(109%)
All electrical failures or malfunctions	420	(4%)	0	(0%)	22	(5%)	$28	(8%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Factor Contributing to Ignition reported as none, unknown, or blank.

Source: NFIRS and NFPA survey.

Table 4-11. Non-Home Structure Fires Starting With Ignition of Flammable or Combustible Liquid, 2007-2011 Annual Averages, by Area of Origin

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Kitchen	4,760	(41%)	1	(3%)	119	(26%)	$29	(8%)
Heating equipment room	1,190	(10%)	0	(0%)	7	(1%)	$28	(7%)
Garage*	630	(5%)	4	(12%)	65	(14%)	$27	(7%)
Unclassified equipment or service area	410	(3%)	0	(0%)	8	(2%)	$28	(7%)
Maintenance or paint shop or area	380	(3%)	5	(13%)	51	(11%)	$39	(10%)
Processing or manufacturing area or workroom	370	(3%)	0	(0%)	25	(6%)	$40	(11%)
Unclassified area of origin	250	(2%)	0	(0%)	3	(1%)	$2	(0%)
Unclassified outside area	240	(2%)	0	(0%)	3	(1%)	$3	(1%)
Machinery room or area	230	(2%)	0	(0%)	4	(1%)	$16	(4%)
Duct for HVAC, cable, exhaust, heating, or air conditioning	210	(2%)	0	(0%)	0	(0%)	$1	(0%)
Unclassified storage area	200	(2%)	2	(6%)	8	(2%)	$12	(3%)
Engine area, running gear or wheel area vehicle	190	(2%)	1	(3%)	10	(2%)	$8	(2%)
Unclassified function area	140	(1%)	1	(2%)	7	(1%)	$6	(2%)
Storage room, area, tank, or bin	140	(1%)	0	(1%)	10	(2%)	$9	(2%)
Storage of supplies or tools	130	(1%)	1	(4%)	6	(1%)	$4	(1%)
Exterior wall surface	130	(1%)	1	(2%)	1	(0%)	$4	(1%)
Fuel tank or fuel line of vehicle	110	(1%)	1	(4%)	10	(2%)	$11	(3%)
Unclassified service facility	100	(1%)	0	(0%)	5	(1%)	$3	(1%)
Lawn, field or open area	100	(1%)	0	(0%)	1	(0%)	$0	(0%)
Unclassified structural area	90	(1%)	1	(3%)	5	(1%)	$3	(1%)
Laboratory	80	(1%)	0	(0%)	24	(5%)	$3	(1%)
Lobby or entrance way	80	(1%)	3	(10%)	3	(1%)	$5	(1%)
Unclassified means of egress	70	(1%)	0	(0%)	3	(1%)	$6	(2%)
Crawl space or substructure space	70	(1%)	1	(3%)	1	(0%)	$0	(0%)

Table 4-11. Non-Home Structure Fires Starting With Ignition of Flammable or Combustible Liquid, 2007-2011 Annual Averages, by Area of Origin (Continued)

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Exterior roof surface	70	(1%)	0	(0%)	2	(0%)	$2	(0%)
On or near highway, public way or street	70	(1%)	0	(0%)	0	(0%)	$0	(0%)
Courtyard, terrace or patio	60	(1%)	0	(0%)	6	(1%)	$0	(0%)
Laundry room or area	60	(1%)	0	(0%)	1	(0%)	$0	(0%)
Other known area of origin **	1,160	(10%)	12	(34%)	70	(15%)	$85	(23%)
Total	11,710	(100%)	34	(100%)	458	(100%)	$374	(100%)

* May not include or be limited to garages coded as property use.

** Leading areas of origin for deaths not shown above are interior stairway or ramp (6% of deaths), unclassified vehicle area (6%), living room, lounge, family room or den (5%), and attic or ceiling/roof assembly or concealed space (4%).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Area of Origin reported as unknown or blank.

Source: NFIRS and NFPA survey.

Section 5. Class IIIB Combustible Liquid

During 2007-2011, an average of 47,430 fires per year were reported as having begun with the ignition of Class IIIB combustible liquid as the type of material first ignited. These fires caused an average of 29 civilian deaths per year, 2,012 civilian injuries per year, and $370 million in direct property damage per year. Class IIIB combustible liquids include cooking oil, transformer oil, and lubricating oil. As will be clear in this section, nearly all these fires probably involve cooking oil and not transformer or lubricating oil.

Tables 5-A.1, 5-A.2, and 5-A.3 show how these fires divide, first into fires at homes versus any other property use, and within those two groups, into structure, vehicle, and outdoor or other fires. Nearly all home losses are in structure fires, but nearly half of the fires are not in structure fires. Vehicle fires are a much larger share of non-home fires than home fires.

Table 5-A.1. Fires Starting With Ignition of Class IIIB Combustible Liquid 2007-2011 Annual Averages, by Property Use

Property Use	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Home	30,870	(65%)	28	(97%)	1,855	(92%)	$225	(61%)
Non-home	16,560	(35%)	1	(3%)	157	(8%)	$145	(39%)
Total	47,430	(100%)	29	(100%)	2,012	(100%)	$370	(100%)

Note: See text box on p. 92 for details on calculations. Source: NFIRS and NFPA survey.

Table 5-A.2. Home Fires Starting With Ignition of Class IIIB Combustible Liquid 2007-2011 Annual Averages, by Incident Type

Incident Type	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Structure fire	28,180	(91%)	27	(99%)	1,838	(99%)	$222	(99%)
Vehicle fire	180	(1%)	0	(0%)	0	(0%)	$0	(0%)
Outdoor or other fire	2,510	(8%)	0	(1%)	17	(1%)	$2	(1%)
Total	30,870	(100%)	28	(100%)	1,855	(100%)	$225	(100%)

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

Table 5-A.3. Non-Home Fires Starting With Ignition of Class IIIB Combustible Liquid 2007-2011 Annual Averages, by Incident Type

Incident Type	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Structure fire	5,560	(34%)	1	(56%)	134	(86%)	$60	(42%)
Vehicle fire	7,680	(46%)	0	(0%)	17	(11%)	$33	(22%)
Outdoor or other fire	3,320	(20%)	0	(44%)	5	(3%)	$52	(36%)
Total	16,560	(100%)	1	(100%)	157	(100%)	$145	(100%)

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

Data Sources, Definitions and Conventions Used in This Section

Unless otherwise specified, the statistics in this analysis are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to federal or state agencies or industrial fire brigades. These estimates are projections based on the detailed information collected in Version 5.0 of the U.S. Fire Administration's National Fire Incident Reporting System (NFIRS 5.0) and the National Fire Protection Association's (NFPA's) annual fire department experience survey. In general, any fire that occurs in or on a structure is considered a structure fire, even if the fire was limited to contents and the building itself was not damaged.

"Home" includes one- and two-family homes, manufactured homes, and multi-family housing, including apartments.

Flammable and combustible liquids are identified in NFIRS 5.0 Type of Material First Ignited:
20 – Unclassified or unknown type flammable or combustible liquid. Corresponds to codes 20 (unknown) and 29 (unclassified) in earlier versions of NFIRS.
21 – Class IA flammable liquid, including ethyl ether and pentane.
22 – Class IB flammable liquid, including acetone, ethyl alcohol, and methyl-ethyl-ketone.
23 – Gasoline.
24 – Class IC flammable liquid, including turpentine and butyl alcohol.
25 –.Class II combustible liquid, including kerosene, diesel, paint thinner, and Nos. 1 and 2 fuel oil. No. 2 fuel oil includes the once the separate category of No. 3 fuel oil.
26 – Class IIIA combustible liquid, including cottonseed oil, produced creosote oil, and Nos. 4, 5 and 6 fuel oil. Creosote oil is primarily introduced into buildings when wood burns incompletely.
27 – Class IIIB combustible liquid, including cooking oil, transformer oil, and lubricating oil.
28 – Ethanol, added in 2008.

NFIRS 5.0 includes a category of structure fires collectively referred to as "confined fires," identified by incident type. These include confined cooking fires, confined chimney or flue fires, confined trash fires, confined fuel burner or boiler fires, confined commercial compactor fires, and confined incinerator fires (incident type 113-118). Losses are generally minimal in these fires, which by definition, are assumed to have been limited to the object of origin. Although detailed data is not required for these fires, it is sometimes present.

Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Property damage has not been adjusted for inflation. Fires are rounded to the nearest ten, civilian deaths and injuries to the nearest one, and direct property damage to the nearest million. Additional details on the methodology may be found in Appendix A.

Reporting of Type of Material First Ignited is not required if Item First Ignited is coded in the range of 70 to 99. As with confined fires, the field is nevertheless reported for many fires, but the percentage of unknowns and blanks is higher. Fires are analyzed separately for (1) non-confined structure fires, (2) confined structure fires, (3) vehicle fires, (4) outdoor or other vegetation fires, and (5) outdoor or other non-vegetation fires (principally trash). For each of these, fires are analyzed separately for Item First Ignited 70-99 and Item First Ignited not 70-99.

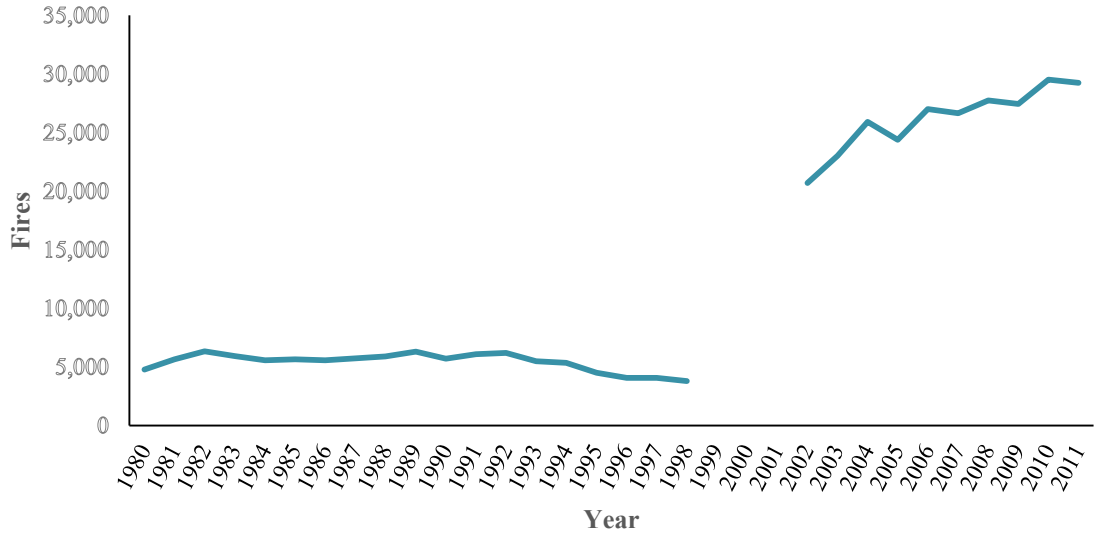
A. Homes

Class IIIB combustible liquid home structure fires increased from 1980 to 2011 primarily as a result of the introduction of NFIRS Version 5.0 and have shown a slightly increasing trend in recent years.

Table 5-1 and Figure 5-1 show the trends in home fires starting with ignition of Class IIIB combustible liquids from 1980 to 2011. Fires rose and fell after 1980 for a net reduction as of 1998, then jumped, when NFIRS version 5.0 was introduced, to levels four times anything seen before. More recently, the trend has been slightly increasing.

It seems clear that a large part of the increase in home Class IIIB combustible liquid fires is associated with the introduction by NFIRS 5.0 of confined fires, particularly confined cooking fires. Detailed reporting is not required for fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, incinerator, compactor, or trash). Cooking oil is a Class IIIB combustible liquid, but it is not a fuel for cooking equipment. It is a medium by which food is heated.

Figure 5-1. Home Structure Fires Starting With Ignition of Class IIIB Combustible Liquid



Note: See Note on Table 5-1. Source: NFIRS and NFPA survey.

Most home structure fires starting with ignition of Class IIIB combustible liquid involve cooking equipment as the heat source.

Table 5-2 shows that three of the five leading heat sources, accounting for two-thirds of the fires, involve equipment. Table 5-3 shows that four types of cooking equipment account for three-fourths of the home fires when Class IIIB combustible liquid is ignited. Roughly three out of five of these Class IIIB combustible liquid home structure fires are confined fires.

One-third (36%) of home structure fires starting with ignition of Class IIIB combustible liquid involved unattended equipment, a behavior associated with stovetop cooking fires.

Table 5-4 shows the leading factors contributing to ignition, most of which are consistent with equipment as the heat source. Some of the leading factors point to behaviors that could be made safer, including abandoning material (like a lit cigarette), misuse of material (like the combustible liquid), insufficient separation between heat source and combustible, and unintentionally leaving equipment (such as cooking equipment) turned on. Intentional fires accounted for only 1% of home fires starting with Class IIIB combustible liquids.

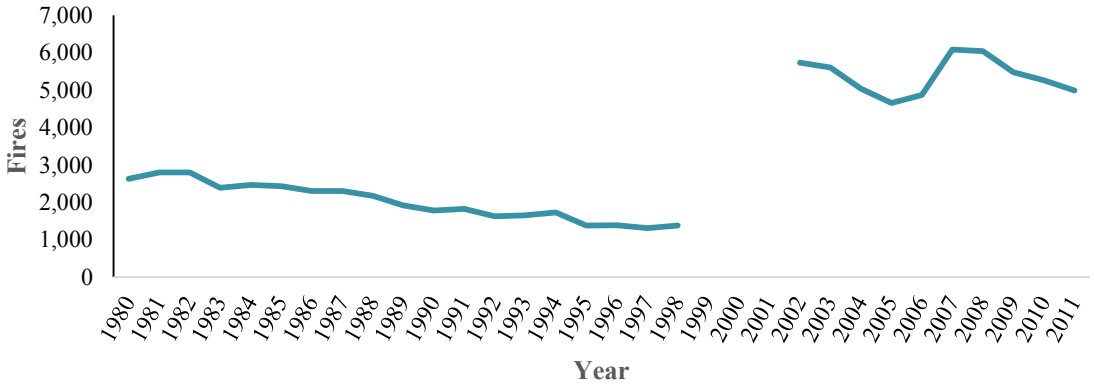
Nearly all (96%) home structure fires starting with ignition of Class IIIB combustible liquid began in the kitchen.
This is the clearest evidence that cooking oil dominates these fires and cooking-related ignitions provide the principal ignition scenarios. Table 5-5 shows the leading areas of origin.

B. Properties Other Than Homes

Four out of five (81%) non-home structure fires starting with ignition of Class IIIB combustible liquid occur at public assembly (38%), residential (25%), or store or office (18%) properties.
Many of these places feature commercial cooking as an activity, which makes it possible that the significant role of cooking equipment as heat sources for home Class IIIB combustible liquid fires may be repeated in many types of non-home properties. Table 5-6 shows the shares of these fires by major property use group.

Class IIIB combustible liquid non-home structure fires declined substantially from 1980 to 1998 but have shown a roughly level trend in recent years.
Table 5-7 and Figure 5-2 show the trends in non-home fires starting with ignition of Class IIIB combustible liquid, from 1980 to 2011. Fires dropped by roughly half from 1980 to 1998, then jumped to levels more than double the highest levels previously seen when NFIRS Version 5.0 was introduced. More recently, the trend has been up and then down with little or no net change.

Figure 5-2. Non-Home Structure Fires Starting With Ignition of Class IIIB Combustible Liquid



Note: See Note on Table 5-7. Source: NFIRS and NFPA survey.

Most non-home structure fires starting with ignition of Class IIIB combustible liquid involve cooking equipment as the heat source.
Table 5-8 shows that three of the four leading heat sources, accounting for three out of five of these fires, involve equipment. Table 5-9 shows that cooking equipment is the type of equipment involved for most non-home Class IIIB combustible liquid fires when equipment is involved. Deep fryers alone account for more than one-third of the fires. Torches, burners, and soldering equipment, with 2% of non-home Class IIIB combustible liquid structure fires, had the largest share for any equipment other than cooking equipment, although the burners reported may have included burners on stovetops.

Note that the specific Class IIIB combustible liquid most often ignited is cooking oil, which is not a fuel for cooking equipment but a medium for heating food. Even so, when equipment ignites liquid, the liquid ignited may not have been in use by the equipment that ignited the liquid. In fact, pilot lights for equipment that is not turned on can serve as a heat source for combustible liquids located near the equipment, as can hot surfaces from any operating equipment near the released liquid.

One-third (34%) of non-home structure fires starting with ignition of Class IIIB combustible liquid involved failure to clean or unattended equipment as a factor contributing to ignition.
Table 5-10 shows the leading factors contributing to ignition, most of which are consistent with cooking equipment as the heat source. Some of the other leading factors also point to behavior that could be made safer, including insufficient separation between heat source and combustible, unintentionally leaving equipment turned on, and spilling combustible liquid. Intentional fires accounted for only 1% of non-home Class IIIB combustible liquid structure fires.

Four out of five (81%) non-home structure fires starting with ignition of Class IIIB combustible liquid began in a kitchen.
This is consistent with the large role of cooking equipment as heat sources in these fires. Table 5-11 shows the leading areas of origin.

Table 5-1. Home Structure Fires Starting With Ignition of Class IIIB Combustible Liquid, by Year

Year	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions) as Reported	in 2011 Dollars
1980	4,790	6	310	$9	$24
1981	5,660	55	469	$15	$37
1982	6,340	17	576	$10	$24
1983	5,930	26	457	$19	$43
1984	5,570	3	453	$20	$43
1985	5,660	7	462	$16	$34
1986	5,560	22	452	$20	$40
1987	5,740	17	468	$18	$35
1988	5,910	18	529	$23	$44
1989	6,320	13	522	$26	$47
1990	5,720	19	513	$26	$44
1991	6,100	6	503	$35	$58
1992	6,210	0	524	$25	$40
1993	5,490	17	487	$24	$37
1994	5,360	29	392	$22	$34
1995	4,500	0	389	$24	$35
1996	4,070	11	388	$25	$35
1997	4,070	4	318	$26	$37
1998	3,800	4	321	$18	$25
1999	10,490	0	1,245	$60	$81
2000	14,230	0	1,266	$86	$113
2001	20,968	18	1,536	$101	$128
2002	20,710	18	1,347	$106	$133
2003	23,010	6	1,505	$160	$195
2004	25,910	17	1,605	$137	$163
2005	24,380	10	1,536	$175	$202
2006	27,000	18	1,607	$184	$206
2007	26,650	47	1,763	$174	$188
2008	27,760	9	1,671	$253	$263
2009	27,460	8	1,957	$222	$233
2010	29,520	33	1,888	$226	$233
2011	29,240	38	1,980	$239	$239

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Also, because participation in NFIRS Version 5.0 was low in the early years (1999-2001), those estimates are especially volatile. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars.

Source: NFIRS and NFPA survey. Inflation adjustments based on consumer price index.

Table 5-2. Home Structure Fires Starting With Ignition of Class IIIB Combustible Liquid, 2007-2011 Annual Averages, by Heat Source

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Radiated or conducted heat from operating equipment	9,820	(35%)	20	(74%)	837	(46%)	$84	(38%)
Unclassified heat from powered equipment	7,550	(27%)	2	(7%)	485	(26%)	$58	(26%)
Unclassified heat source	3,440	(12%)	2	(6%)	152	(8%)	$21	(9%)
Unclassified hot or smoldering object	2,380	(8%)	0	(0%)	91	(5%)	$17	(7%)
Spark, ember or flame from operating equipment	1,290	(5%)	1	(5%)	72	(4%)	$13	(6%)
Heat from direct flame or convection currents	1,180	(4%)	1	(3%)	57	(3%)	$10	(5%)
Molten or hot material	700	(2%)	0	(0%)	56	(3%)	$7	(3%)
Flame or torch used for lighting	460	(2%)	0	(1%)	31	(2%)	$2	(1%)
Smoking material	340	(1%)	0	(1%)	16	(1%)	$5	(2%)
Other known heat source	1,020	(4%)	1	(4%)	42	(2%)	$7	(3%)
Total	28,180	(100%)	27	(100%)	1,838	(100%)	$222	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. Separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Heat Source reported as unknown or blank. Estimates for smoking material, match, lighter, candle, and other open flame sources include proportional shares of firs reported with Heat Source as "other" heat from open flame or smoking material.

Source: NFIRS and NFPA survey.

Table 5-3. Home Structure Fires Starting With Ignition of Class IIIB Combustible Liquid, 2007-2011 Annual Averages, by Equipment Involved in Ignition

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Range with or without oven	17,120	(61%)	26	(95%)	1,333	(73%)	$142	(64%)
Portable or stationary space heater*	3,470	(12%)	0	(0%)	220	(12%)	$21	(10%)
No equipment involved	3,040	(11%)	0	(0%)	157	(9%)	$33	(15%)
Oven or rotisserie	2,220	(8%)	0	(1%)	19	(1%)	$5	(2%)
Portable cooking or warming device**	990	(4%)	0	(1%)	42	(2%)	$10	(4%)
Deep fryer	610	(2%)	0	(1%)	10	(1%)	$7	(3%)
Microwave oven	290	(1%)	0	(0%)	21	(1%)	$0	(0%)
Other known equipment	430	(2%)	0	(0%)	35	(2%)	$4	(2%)
Total	28,180	(100%)	27	(100%)	1,838	(100%)	$222	(100%)

* Nearly all fires involving space heaters specifically involved "heating stoves," which may have been miscoded cooking stoves or dual purpose heating and cooking equipment.

** Nearly all fires involving portable cooking or warming devices specifically involved woks, which use higher temperatures than other cooking devices.

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Equipment Involved in ignition reported as unknown or blank. Reports of no equipment involved are treated as unknown equipment unless Heat Source is coded as 40-99, indicating a known non-equipment Heat Source. Also, equipment reported with a code ending in two zeros is treated as a partial unknown and proportionally allocated (e.g., unclassified or unknown type cooking equipment.

Source: NFIRS and NFPA survey.

Table 5-4. Home Structure Fires Starting With Ignition of Class IIIB Combustible Liquid, 2007-2011 Annual Averages, by Factor Contributing to Ignition

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Equipment unattended	10,100	(36%)	17	(62%)	825	(45%)	$105	(47%)
Abandoned or discarded material	3,460	(12%)	4	(13%)	206	(11%)	$30	(14%)
Unclassified misuse of material	2,760	(10%)	3	(11%)	200	(11%)	$19	(8%)
Unclassified factor contributed to ignition	2,500	(9%)	1	(3%)	152	(8%)	$16	(7%)
Heat source too close to combustibles	2,130	(8%)	0	(0%)	115	(6%)	$15	(7%)
Unintentionally turned on or not turned off	2,030	(7%)	0	(0%)	135	(7%)	$19	(8%)
Flammable liquid or gas spilled	1,640	(6%)	4	(16%)	110	(6%)	$9	(4%)
Failure to clean	1,380	(5%)	0	(0%)	19	(1%)	$1	(0%)
Unclassified operational deficiency	610	(2%)	1	(3%)	49	(3%)	$7	(3%)
Equipment not being operated properly	570	(2%)	0	(0%)	45	(2%)	$3	(1%)
Unclassified fire spread or control	300	(1%)	1	(3%)	9	(0%)	$4	(2%)
Improper container or storage	270	(1%)	0	(0%)	16	(1%)	$1	(1%)
Unclassified mechanical failure or malfunction	260	(1%)	0	(0%)	6	(0%)	$0	(0%)
Other known factor	1,180	(4%)	0	(0%)	51	(3%)	$7	(3%)
Total	28,180	(100%)	27	(100%)	1,838	(100%)	$222	(100%)
Total factors	29,190	(104%)	30	(111%)	1,938	(105%)	$236	(106%)
All electrical failures or malfunctions	240	(1%)	0	(0%)	5	(0%)	$1	(0%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Factor Contributing to Ignition reported as none, unknown, or blank.

Source: NFIRS and NFPA survey.

Table 5-5. Home Structure Fires Starting With Ignition of Class IIIB Combustible Liquid, 2007-2011 Annual Averages, by Area of Origin

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Kitchen	26,950	(96%)	27	(100%)	1,771	(96%)	$211	(95%)
Unclassified area of origin	280	(1%)	0	(0%)	5	(0%)	$1	(0%)
Unclassified structural area	150	(1%)	0	(0%)	16	(1%)	$1	(1%)
Other known area of origin	800	(3%)	0	(0%)	46	(3%)	$10	(4%)
Total	28,180	(100%)	27	(100%)	1,838	(100%)	$222	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Area of Origin reported as unknown or blank.

Source: NFIRS and NFPA survey.

Table 5-6. Non-Home Structure Fires Starting With Ignition of Class IIIB Combustible Liquid, 2007-2011 Annual Averages, by Major Property Use Group

Property Use Group	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Public assembly	2,110	(38%)	1	(100%)	27	(20%)	$16	(27%)
Residential	1,360	(25%)	0	(0%)	48	(36%)	$8	(13%)
Stores and offices	980	(18%)	0	(0%)	15	(11%)	$11	(18%)
Manufacturing	280	(5%)	0	(0%)	6	(5%)	$17	(28%)
Outside or special property	180	(3%)	0	(0%)	4	(3%)	$1	(1%)
Health care or correction	170	(3%)	0	(0%)	10	(8%)	$0	(0%)
Educational	120	(2%)	0	(0%)	19	(14%)	$0	(1%)
Storage	100	(2%)	0	(0%)	2	(2%)	$1	(2%)
Unclassified	50	(1%)	0	(0%)	2	(2%)	$0	(0%)
Industrial, utility, defense, agriculture, or mining	50	(1%)	0	(0%)	1	(0%)	$5	(8%)
None or undetermined	160	(3%)	0	(0%)	0	(0%)	$1	(1%)
Total	5,560	(100%)	1	(100%)	134	(100%)	$60	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars.

Source: NFIRS and NFPA survey.

Table 5-7. Non-Home Structure Fires Starting With Ignition of Class IIIB Combustible Liquid, by Year

Year	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions) as Reported	in 2011 Dollars
1980	2,630	0	44	$13	$36
1981	2,800	0	83	$24	$60
1982	2,800	0	109	$20	$46
1983	2,390	0	81	$19	$42
1984	2,460	6	84	$63	$135
1985	2,430	4	57	$30	$63
1986	2,300	3	94	$40	$83
1987	2,300	3	74	$29	$57
1988	2,170	16	82	$19	$37
1989	1,920	0	76	$28	$51
1990	1,780	5	83	$38	$66
1991	1,820	0	53	$44	$73
1992	1,630	0	141	$34	$55
1993	1,650	0	125	$106	$165
1994	1,730	0	71	$41	$62
1995	1,380	0	74	$30	$44
1996	1,390	0	50	$27	$39
1997	1,310	0	29	$28	$39
1998	1,380	7	29	$18	$25
1999	2,870	0	104	$70	$94
2000	3,410	0	21	$26	$34
2001	5,650	5	159	$109	$139
2002	5,730	0	133	$49	$62
2003	5,600	0	78	$32	$38
2004	5,040	7	98	$38	$45
2005	4,650	5	101	$50	$58
2006	4,870	0	87	$39	$43
2007	6,080	0	102	$77	$84
2008	6,040	0	189	$51	$53
2009	5,470	0	138	$63	$66
2010	5,260	3	131	$48	$50
2011	4,990	0	101	$64	$64

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Also, because participation in NFIRS Version 5.0 was low in the early years (1999-2001), those estimates are especially volatile. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars.

Source: NFIRS and NFPA survey. Inflation adjustments based on consumer price index.

Table 5-8. Non-Home Structure Fires Starting With Ignition of Class IIIB Combustible Liquid, 2007-2011 Annual Averages, by Heat Source

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Unclassified heat from powered equipment	1,510	(27%)	0	(0%)	31	(23%)	$14	(22%)
Radiated or conducted heat from operating equipment	1,390	(25%)	0	(0%)	54	(40%)	$12	(20%)
Unclassified heat source	720	(13%)	1	(100%)	8	(6%)	$4	(7%)
Spark, ember or flame from operating equipment	580	(10%)	0	(0%)	11	(8%)	$11	(18%)
Unclassified hot or smoldering object	310	(6%)	0	(0%)	6	(4%)	$2	(4%)
Heat from direct flame or convection currents	250	(5%)	0	(0%)	10	(8%)	$2	(4%)
Flame or torch used for lighting	240	(4%)	0	(0%)	5	(4%)	$4	(7%)
Molten or hot material	180	(3%)	0	(0%)	2	(2%)	$4	(7%)
Arcing	100	(2%)	0	(0%)	3	(2%)	$3	(5%)
Smoking material	90	(2 %)	0	(0%)	1	(1%)	$1	(1%)
Unclassified heat spread from another fire	30	(1%)	0	(0%)	2	(1%)	$1	(1%)
Other known heat source	160	(3%)	0	(0%)	2	(1%)	$2	(4%)
Total	5,560	(100%)	1	(100%)	134	(100%)	$60	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. Separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Heat Source reported as unknown or blank. Estimates for smoking material, match, lighter, candle, and other open flame sources include proportional shares of fires reported with Heat Source as "other" heat from open flame or smoking materials.

Source: NFIRS and NFPA survey.

Table 5-9. Non-Home Structure Fires Starting with Ignition of Class IIIB Combustible Liquid, 2007-2011 Annual Averages, by Equipment Involved in Ignition

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Deep fryer	2,140	(38%)	*	(*)	47	(35%)	$12	(20%)
Range with or without oven	1,050	(19%)	*	(*)	54	(41%)	$6	(10%)
Portable or stationary space heater	460	(8%)	*	(*)	6	(4%)	$5	(8%)
No equipment involved	450	(8%)	*	(*)	4	(3%)	$4	(7%)
Portable cooking or warming device	340	(6%)	*	(*)	3	(2%)	$1	(2%)
Grill	220	(4%)	*	(*)	4	(3%)	$1	(1%)
Oven or rotisserie	190	(3%)	*	(*)	6	(4%)	$0	(0%)
Grease hood or duct exhaust fan	100	(2%)	*	(*)	4	(3%)	$1	(1%)
Torch, burner, or soldering equipment	90	(2%)	*	(*)	2	(1%)	$1	(1%)
Central heating unit	60	(1%)	*	(*)	0	(0%)	$0	(0%)
Transformer	50	(1%)	*	(*)	0	(0%)	$0	(0%)
Unclassified hydraulic equipment	40	(1%)	*	(*)	2	(1%)	$4	(6%)
Unclassified equipment involved in ignition	30	(1%)	*	(*)	0	(0%)	$1	(2%)
Separate motor	30	(1%)	*	(*)	0	(0%)	$1	(1%)
Other known equipment*	310	(5%)	*	(*)	2	(2%)	$24	(40%)
Total	5,560	(100%)	1	(100%)	134	(100%)	$60	(100%)

* Cannot be calculated because all deaths are in fires with equipment involved in ignition unknown.

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Equipment Involved in Ignition reported as unknown or blank. Reports of no equipment involved are treated as unknown equipment unless Heat Source is coded as 40-99, indicating a known non-equipment Heat Source. Also, equipment reported with a code ending in two zeros is treated as a partial unknown and proportionally allocated (e.g., unclassified or unknown type cooking equipment).

Source: NFIRS and NFPA survey.

Table 5-10. Non-Home Structure Fires Starting With Ignition of Class IIIB Combustible Liquid, 2007-2011 Annual Averages, by Factor Contributing to Ignition

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Failure to clean	1,070	(19%)	0	(0%)	6	(5%)	$7	(12%)
Equipment unattended	810	(15%)	0	(0%)	28	(21%)	$8	(14%)
Unclassified misuse of material or product	480	(9%)	0	(0%)	40	(30%)	$1	(2%)
Unclassified mechanical failure or malfunction	390	(7%)	0	(0%)	10	(8%)	$5	(9%)
Heat source too close to combustibles	390	(7%)	0	(0%)	8	(6%)	$6	(10%)
Unclassified factor contributed to ignition	350	(6%)	0	(0%)	9	(7%)	$3	(5%)
Unintentionally turned on or not turned off	330	(6%)	0	(0%)	6	(4%)	$3	(5%)
Flammable liquid or gas spilled	300	(5%)	0	(0%)	6	(4%)	$2	(3%)
Abandoned or discarded material	300	(5%)	1	(100%)	8	(6%)	$6	(10%)
Unclassified operational deficiency	240	(4%)	0	(0%)	6	(4%)	$1	(1%)
Leak or break	170	(3%)	0	(0%)	2	(1%)	$6	(10%)
Equipment not being operated properly	130	(2%)	0	(0%)	2	(1%)	$1	(1%)
Unclassified electrical failure or malfunction	100	(2%)	0	(0%)	1	(1%)	$1	(2%)
Automatic control failure	100	(2%)	0	(0%)	2	(1%)	$1	(1%)
Improper startup	90	(2%)	0	(0%)	0	(0%)	$0	(1%)
Improper container or storage	80	(1%)	0	(0%)	1	(1%)	$0	(0%)
Unspecified short circuit arc	70	(1%)	0	(0%)	0	(0%)	$2	(3%)
Unclassified fire spread or control	60	(1%)	0	(0%)	2	(2%)	$1	(1%)
Cutting or welding too close to combustible	50	(1%)	0	(0%)	1	(1%)	$4	(6%)
Worn out	50	(1%)	0	(0%)	0	(0%)	$0	(0%)
Manual control failure	50	(1%)	0	(0%)	0	(0%)	$0	(0%)
Equipment overloaded	40	(1%)	0	(0%)	0	(0%)	$1	(1%)
Outside or open fire for warming or cooking	40	(1%)	0	(0%)	0	(0%)	$0	(0%)
Other known factor	180	(3%)	0	(0%)	5	(4%)	$7	(12%)

Table 5-10. Non-Home Structure Fires Starting With Ignition of Class IIIB Combustible Liquid, 2007-2011 Annual Averages, by Factor Contributing to Ignition

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Total	5,560	(100%)	1	(100%)	134	(100%)	$60	(100%)
Total factors	5,860	(105%)	1	(100%)	142	(106%)	$66	(109%)
All electrical failures or malfunctions	200	(4%)	0	(0%)	1	(1%)	$4	(7%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Factor Contributing to Ignition reported as none, unknown, or blank.

Source: NFIRS and NFPA survey.

Table 5-11. Non-Home Structure Fires Starting With Ignition of Class IIIB Combustible Liquid, 2007-2011 Annual Averages, by Area of Origin

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Kitchen	4,510	(81%)	0	(0%)	101	(76%)	$27	(44%)
Unclassified equipment or service area	140	(2%)	0	(0%)	0	(0%)	$2	(4%)
Processing or manufacturing area or workroom	110	(2%)	0	(0%)	5	(3%)	$13	(21%)
Unclassified area of origin	100	(2%)	0	(0%)	0	(0%)	$0	(1%)
Machinery room or area	80	(1%)	0	(0%)	1	(1%)	$7	(12%)
Duct for HVAC, cable, exhaust, heating, or air conditioning	60	(1%)	0	(0%)	0	(0%)	$0	(0%)
Garage*	40	(1%)	0	(0%)	2	(2%)	$1	(1%)
Dining room, bar or cafeteria	40	(1%)	0	(0%)	0	(0%)	$2	(3%)
Maintenance or paint shop or area	40	(1%)	0	(0%)	0	(0%)	$3	(5%)
Unclassified service facility	40	(1%)	0	(0%)	1	(0%)	$0	(0%)
Unclassified outside area	30	(1%)	0	(0%)	0	(0%)	$0	(0%)
Heating equipment room	30	(1%)	0	(0%)	0	(0%)	$0	(0%)
Other known area of origin**	350	(6%)	1	(100%)	25	(18%)	$5	(8%)
Total	5,560	(100%)	1	(100%)	134	(100%)	$60	(100%)

* May not include or be limited to garages coded as property use.

** Leading area for deaths not shown above is exterior wall surface (100% of deaths).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Area of Origin reported as unknown or blank.

Source: NFIRS and NFPA survey.

Section 6. Class II Combustible Liquid

During 2007-2011, an average of 12,730 fires per year were reported as having begun with the ignition of Class II combustible liquid as the type of material first ignited. These fires caused an average of 31 civilian deaths per year, 139 civilian injuries per year, and $110 million in direct property damage per year. Class II combustible liquids include kerosene, diesel, paint thinner, and (with some exceptions based on region and time of year) Nos. 1 and 2 fuel oil.

Tables 6-A.1, 6-A.2 and 6-A.3 show how these fires divide, first into fires at homes versus any other property use, and within those two groups, into structure, vehicle, and outdoor or other fires. Nearly all home losses are in structure fires, but nearby half of the fires are not in structure fires. Vehicle fires are a much larger share of non-home fires than home fires.

Table 6-A.1. Fires Starting With Ignition of Class II Combustible Liquid
2007-2011 Annual Averages, by Property Use

Property Use	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Home	7,340	(58%)	10	(32%)	95	(68%)	$15	(14%)
Other property use	5,390	(42%)	21	(68%)	44	(32%)	$95	(86%)
Total	12,730	(100%)	31	(100%)	139	(100%)	$110	(100%)

Note: See text box on p. 110 for details on calculations. Source: NFIRS and NFPA survey.

Table 6-A.2. Home Fires Starting With Ignition of Class II Combustible Liquid
2007-2011 Annual Averages, by Incident Type

Incident Type	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Structure fire	6,890	(94%)	10	(96%)	93	(98%)	$14	(95%)
Vehicle fire	50	(1%)	0	(0%)	0	(0%)	$1	(5%)
Outdoor or other fire	400	(5%)	0	(4%)	2	(2%)	$0	(0%)
Total	7,340	(100%)	10	(100%)	95	(100%)	$15	(100%)

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

Table 6-A.3. Non-Home Fires Starting With Ignition of Class II Combustible Liquid
2007-2011 Annual Averages, by Incident Type

Incident Type	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Structure fire	1,530	(28%)	2	(10%)	15	(34%)	$12	(12%)
Vehicle fire	2,400	(45%)	18	(88%)	25	(56%)	$80	(84%)
Outdoor or other fire	1,460	(27%)	0	(2%)	5	(10%)	$4	(4%)
Total	5,390	(100%)	21	(100%)	44	(100%)	$95	(100%)

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

Data Sources, Definitions and Conventions Used in This Section

Unless otherwise specified, the statistics in this analysis are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to federal or state agencies or industrial fire brigades. These estimates are projections based on the detailed information collected in Version 5.0 of the U.S. Fire Administration's National Fire Incident Reporting System (NFIRS 5.0) and the National Fire Protection Association's (NFPA's) annual fire department experience survey. In general, any fire that occurs in or on a structure is considered a structure fire, even if the fire was limited to contents and the building itself was not damaged.

"Home" includes one- and two-family homes, manufactured homes, and multi-family housing, including apartments.

Flammable and combustible liquids are identified in NFIRS 5.0 Type of Material First Ignited:
20 – Unclassified or unknown type flammable or combustible liquid. Corresponds to codes 20 (unknown) and 29 (unclassified) in earlier versions of NFIRS.
21 – Class IA flammable liquid, including ethyl ether and pentane.
22 – Class IB flammable liquid, including acetone, ethyl alcohol, and methyl-ethyl-ketone.
23 – Gasoline.
24 – Class IC flammable liquid, including turpentine and butyl alcohol.
25 –.Class II combustible liquid, including kerosene, diesel, paint thinner, and Nos. 1 and 2 fuel oil. No. 2 fuel oil includes the once separate category of No. 3 fuel oil.
26 – Class IIIA combustible liquid, including cottonseed oil, produced creosote oil, and Nos. 4, 5 and 6 fuel oil. Creosote oil is primarily introduced into buildings when wood burns incompletely.
27 – Class IIIB combustible liquid, including cooking oil, transformer oil, and lubricating oil.
28 – Ethanol, added in 2008.

NFIRS 5.0 includes a category of structure fires collectively referred to as "confined fires," identified by incident type. These include confined cooking fires, confined chimney or flue fires, confined trash fires, confined fuel burner or boiler fires, confined commercial compactor fires, and confined incinerator fires (incident type 113-118). Losses are generally minimal in these fires, which by definition, are assumed to have been limited to the object of origin. Although detailed data is not required for these fires, it is sometimes present.

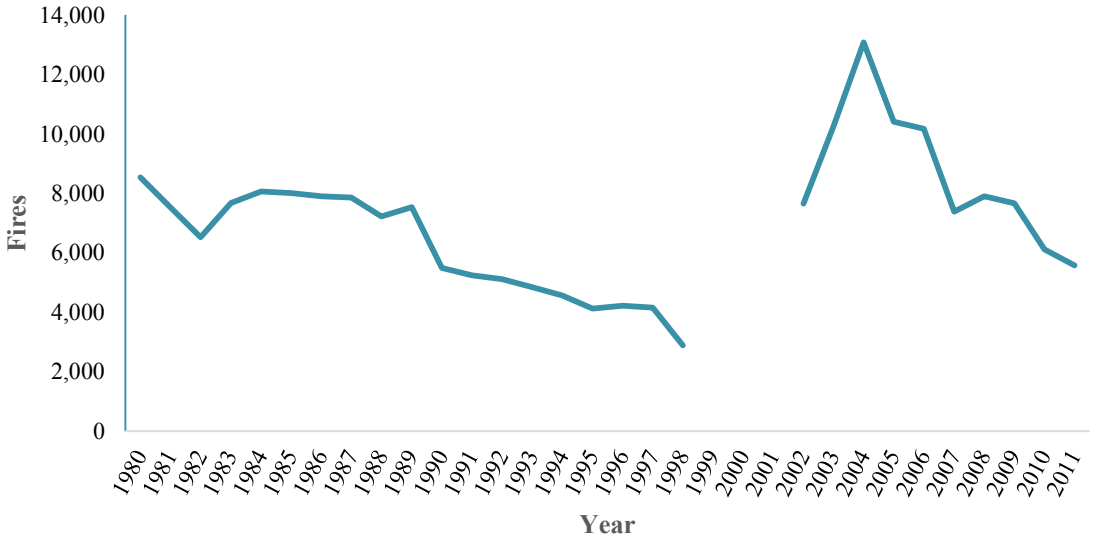
Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Property damage has not been adjusted for inflation. Fires are rounded to the nearest ten, civilian deaths and injuries to the nearest one, and direct property damage to the nearest million. Additional details on the methodology may be found in Appendix A.

Reporting of Type of Material First Ignited is not required if Item First Ignited is coded in the range of 70 to 99. As with confined fires, the field is nevertheless reported for many fires, but the percentage of unknowns and blanks is higher. Fires are analyzed separately for (1) non-confined structure fires, (2) confined structure fires, (3) vehicle fires, (4) outdoor or other vegetation fires, and (5) outdoor or other non-vegetation fires (principally trash). For each of these, fires are analyzed separately for Item First Ignited 70-99 and Item First Ignited not 70-99.

A. Homes

Class II combustible liquid home structure fires declined substantially from 1980 to 1998 and have shown a declining trend in recent years.
Table 6-1 and Figure 6-1 shows the trends in home fires starting with ignition of Class II combustible liquids, from 1980 to 2011. Fires dropped by more than half from 1980 to 1998, then jumped to higher levels than previously seen when NFIRS Version 5.0 was introduced. More recently, fires have shown a downward trend but from a higher starting point.

Figure 6-1. Home Structure Fires Starting With Ignition of Class II Combustible Liquid



Note: See Note on Table 6-1. Source: NFIRS and NFPA survey.

Most home structure fires starting with ignition of Class II combustible liquid involve heating equipment as the heat source.
Table 6-2 shows that three of the four leading heat sources, accounting for four out of five of these fires, involve equipment. Table 6-3 shows that heating equipment is the type of equipment involved for most home Class II combustible liquid fires when equipment is involved. It seems clear that a large part of the increase in home Class II combustible liquid fires is associated with the introduction by NFIRS 5.0 of confined fires, where detailed reporting is not required.

All of the common home heating liquid fuels – kerosene and Nos. 1 and 2 fuel oil – are Class II combustible liquids. While there are separate statistics for kerosene vs. fuel oil usage, fires cannot be separated, which means comparative fire risk cannot be calculated.

Note that when equipment ignited a combustible liquid, the liquid ignited may not have been in use by the equipment that ignited the liquid. In fact, pilot lights for equipment that is not turned on can serve as a heat source for combustible liquid spilled or otherwise released near the pilot light, as can hot surfaces from any operating equipment near the released liquid.

Nearly three-fourths (72%) of home structure fires starting with ignition of Class II combustible liquid involved one of three equipment problems – unclassified mechanical failure or malfunction, automatic control failure, or backfire – as a factor contributing to ignition.
Table 6-4 shows the leading factors contributing to ignition, most of which are consistent with heating equipment as the heat source. Some of the leading factors point to behaviors that could be made safer, including failure to clean. Intentional fires accounted for 3% of home Class II combustible liquid structure fires.

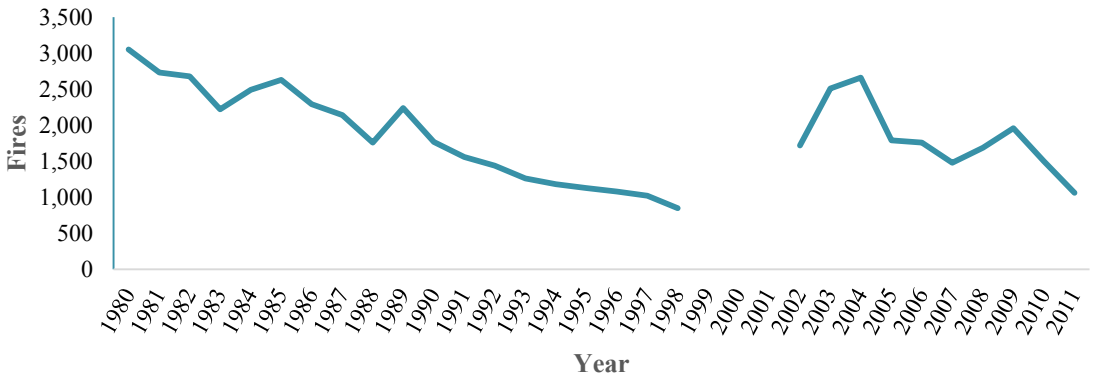
Two-thirds (65%) of home structure fires starting with ignition of Class II combustible liquids began in the heating equipment room.
This is consistent with the large role of heating equipment as heat sources in these fires. Table 6-5 shows the leading areas of origin.

B. Properties Other Than Homes

Over half (56%) of non-home structure fires starting with ignition of Class II combustible liquid occur at store or office (26%), public assembly (15%), or residential (15%) properties.
These appear to be places where heating equipment is fueled by common home heating fuels as opposed to common commercial or industrial heating fuels (Nos. 4 and 5 fuel oil), which are typically Class IIIA combustible liquids. Table 6-6 shows the shares of these fires by major property use group.

Class II combustible liquid non-home structure fires declined substantially from 1980 to 1998 and have shown a declining trend in recent years.
Table 6-7 and Figure 6-2 show the trends in non-home structure fires starting with ignition of Class II combustible liquid from 1980 to 2011. Fires dropped by more than two-thirds from 1980 to 1998, then jumped to the levels of the late 1980s by 2003-2004 after NFIRS Version 5.0 was introduced. More recently, the trend has again been downward.

Figure 6-2. Non-Home Structure Fires Starting With Ignition of Class II Combustible Liquid



Note: See Note on Table 6-7.

Source: NFIRS and NFPA survey.

Most non-home structure fires starting with ignition of Class II combustible liquid involve heating equipment as the heat source.
Table 6-8 shows that three of the four leading heat sources, accounting for three-quarters of the fires, involve equipment. Table 6-9 shows that, as in homes, heating equipment is the type of equipment involved for most non-home Class II combustible liquid fires when equipment is involved. Torches, burners, and soldering equipment, with 4% of non-home Class II combustible liquid structure fires, had the largest equipment share for any equipment other than heating equipment.

Note that when equipment ignites a combustible liquid, the liquid ignited may not have been in use by the equipment that ignited the liquid. In fact, pilot lights for equipment that is not turned on can serve as a heat source for combustible liquid spilled, leaking or otherwise released near the pilot light, as can hot surfaces from any operating equipment near the released liquid.

Half (51%) of non-home structure fires starting with ignition of Class II combustible liquid involved unclassified mechanical failure or malfunction as a factor contributing to ignition.
Table 6-10 shows the leading factors contributing to ignition, most of which are consistent with heating equipment as the heat source. Intentional fires accounted for 6% of non-home Class II combustible liquid structure fires.

Three out of five (59%) non-home structure fires starting with ignition of a Class II combustible liquid began in a heating equipment room.
This is consistent with the large role of heating equipment as heat sources in these fires. Table 6-11 shows the leading areas of origin.

Table 6-1. Home Structure Fires Starting With Ignition of Class II Combustible Liquid, by Year

Year	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions) as Reported	in 2011 Dollars
1980	8,540	23	137	$31	$85
1981	7,530	105	197	$29	$73
1982	6,520	75	244	$27	$64
1983	7,680	100	344	$38	$85
1984	8,060	70	217	$37	$79
1985	8,010	127	350	$44	$91
1986	7,900	93	244	$38	$79
1987	7,860	107	286	$48	$96
1988	7,220	88	343	$38	$73
1989	7,540	150	305	$54	$98
1990	5,490	62	260	$45	$77
1991	5,240	84	219	$45	$74
1992	5,110	52	218	$37	$59
1993	4,850	48	223	$38	$60
1994	4,560	70	198	$27	$41
1995	4,120	29	205	$40	$58
1996	4,220	50	132	$28	$40
1997	4,160	71	144	$24	$33
1998	2,890	29	116	$22	$30
1999	4,670	0	204	$6	$8
2000	5,430	0	392	$27	$36
2001	6,950	23	115	$19	$25
2002	7,650	16	125	$20	$26
2003	10,260	24	126	$18	$22
2004	13,080	51	141	$28	$33
2005	10,410	11	139	$21	$24
2006	10,170	23	60	$19	$21
2007	7,390	10	160	$14	$15
2008	7,900	11	135	$19	$20
2009	7,670	20	28	$12	$12
2010	6,120	5	94	$14	$15
2011	5,580	4	31	$9	$9

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Also, because participation in NFIRS Version 5.0 was low in the early years (1999-2001), those estimates are especially volatile. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars.

Source: NFIRS and NFPA survey. Inflation adjustments based on consumer price index.

Table 6-2. Home Structure Fires Starting With Ignition of Class II Combustible Liquid, 2007-2011 Annual Averages, by Heat Source

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Spark, ember or flame from operating equipment	2,550	(37%)	6	(59%)	30	(32%)	$4	(31%)
Unclassified heat from powered equipment	2,330	(34%)	1	(9%)	18	(19%)	$2	(15%)
Unclassified heat source	670	(10%)	1	(11%)	25	(27%)	$1	(8%)
Radiated or conducted heat from operating equipment	570	(8%)	0	(0%)	10	(11%)	$1	(8%)
Backfire from internal combustion engine	290	(4%)	0	(0%)	0	(0%)	$0	(0%)
Arcing	100	(1%)	0	(0%)	1	(1%)	$0	(1%)
Heat from direct flame or convection currents	70	(1%)	0	(0%)	1	(1%)	$0	(1%)
Flame or torch used for lighting	50	(1%)	1	(10%)	0	(0%)	$1	(5%)
Unclassified hot or smoldering object	50	(1%)	0	(0%)	0	(0%)	$0	(3%)
Match	50	(1%)	0	(0%)	2	(2%)	$1	(9%)
Other known heat source*	150	(2%)	1	(10%)	6	(6%)	$3	(19%)
Total	6,890	(100%)	10	(100%)	93	(100%)	$14	(100%)

* Leading heat source for deaths not shown above is cigarette lighter (10% of deaths).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. Separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Heat Source reported as unknown or blank. Estimates for smoking material, match, lighter, candle, and other open flame sources include proportional shares of fires reported with Heat Source as "other" heat from open flame or smoking material.

Source: NFIRS and NFPA survey.

Table 6-3. Home Structure Fires Starting With Ignition of Class II Combustible Liquid, 2007-2011 Annual Averages, by Equipment Involved in Ignition

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Central heating unit	4,420	(64%)	3	(28%)	17	(18%)	$3	(20%)
Portable or stationary space heater	1,910	(28%)	4	(43%)	57	(61%)	$5	(35%)
No equipment involved	220	(3%)	0	(0%)	7	(7%)	$4	(30%)
Water heater	220	(3%)	0	(0%)	4	(4%)	$0	(0%)
Other known equipment*	120	(2%)	3	(29%)	8	(9%)	$2	(16%)
Total	6,890	(100%)	10	(100%)	93	(100%)	$14	(100%)

* Leading equipment for deaths not shown above is cigarette lighter (15% of deaths) and range (14%).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Equipment Involved in Ignition reported as unknown or blank. Reports of no equipment involved are treated as unknown equipment unless Heat Source is coded as 40-99, indicating a known non-equipment Heat Source. Also, equipment reported with a code ending in two zeros is treated as a partial unknown and proportionally allocated (e.g., unclassified or unknown type cooking equipment.

Source: NFIRS and NFPA survey.

Table 6-4. Home Structure Fires Starting With Ignition of Class II Combustible Liquid, 2007-2011 Annual Averages, by Factor Contributing to Ignition

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Unclassified mechanical failure or malfunction	2,600	(38%)	1	(11%)	41	(44%)	$2	(17%)
Automatic control failure	1,250	(18%)	0	(0%)	1	(2%)	$0	(1%)
Backfire	1,080	(16%)	0	(0%)	15	(16%)	$1	(5%)
Failure to clean	610	(9%)	0	(0%)	0	(0%)	$0	(1%)
Worn out	240	(3%)	0	(0%)	1	(1%)	$0	(0%)
Unclassified operational deficiency	220	(3%)	0	(0%)	1	(1%)	$0	(1%)
Leak or break	190	(3%)	0	(0%)	3	(4%)	$1	(7%)
Improper startup	160	(2%)	0	(0%)	2	(2%)	$0	(2%)
Unclassified misuse of material	80	(1%)	1	(12%)	7	(8%)	$1	(6%)
Improper fueling technique	80	(1%)	0	(0%)	7	(7%)	$1	(7%)
Equipment not being operated properly	80	(1%)	0	(0%)	5	(5%)	$1	(5%)
Flammable liquid or gas spilled	80	(1%)	0	(0%)	11	(12%)	$4	(27%)
Unclassified factor contributed to ignition	80	(1%)	0	(0%)	1	(1%)	$1	(4%)
Heat source too close to combustibles	60	(1%)	2	(24%)	5	(5%)	$2	(12%)
Flammable liquid used to kindle fire	60	(1%)	3	(27%)	1	(2%)	$1	(9%)
Equipment overloaded	40	(1%)	0	(0%)	0	(0%)	$0	(0%)
Manual control failure	40	(1%)	1	(14%)	0	(0%)	$0	(0%)
Other known factor*	180	(3%)	1	(12%)	4	(4%)	$2	(13%)
Total	6,890	(100%)	10	(100%)	93	(100%)	$14	(100%)
Total factors	7,130	(104%)	10	(100%)	104	(112%)	$16	(117%)
All electrical failures or malfunctions	40	(1%)	0	(0%)	2	(2%)	$0	(2%)

* Leading factor for deaths not shown above is collision, knock down or turn over (12% of deaths).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Factor Contributing to Ignition reported as none, unknown, or blank.

Source: NFIRS and NFPA survey.

Table 6.5. Home Structure Fires Starting With Ignition of Class II Combustible Liquid, 2007-2011 Annual Averages, by Area of Origin

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Heating equipment room	4,470	(65%)	3	(30%)	42	(46%)	$2	(17%)
Duct for HVAC, cable, heating, or air conditioning	410	(6%)	0	(0%)	4	(4%)	$0	(2%)
Crawl space or substructure space	400	(6%)	0	(0%)	5	(5%)	$1	(7%)
Unclassified function area	360	(5%)	0	(0%)	8	(8%)	$1	(10%)
Unclassified area of origin	250	(4%)	0	(0%)	0	(0%)	$0	(1%)
Unclassified equipment or service area	210	(3%)	0	(0%)	0	(0%)	$0	(0%)
Living room, family room, or den	120	(2%)	1	(10%)	10	(11%)	$2	(15%)
Unclassified storage area	90	(1%)	0	(0%)	0	(0%)	$0	(1%)
Kitchen	60	(1%)	1	(11%)	7	(7%)	$1	(9%)
Bedroom	50	(1%)	1	(10%)	8	(9%)	$1	(7%)
Storage room, area, tank, or bin	50	(1%)	0	(0%)	1	(1%)	$0	(0%)
Unclassified service facility	40	(1%)	0	(0%)	1	(1%)	$0	(0%)
Garage*	40	(1%)	0	(0%)	1	(1%)	$1	(4%)
Laundry room or area	40	(1%)	0	(0%)	1	(1%)	$1	(5%)
Heating equipment room	4,470	(65%)	3	(30%)	42	(46%)	$2	(17%)
Duct for HVAC, cable, heating, or air conditioning	410	(6%)	0	(0%)	4	(4%)	$0	(2%)
Crawl space or substructure space	400	(6%)	0	(0%)	5	(5%)	$1	(7%)
Unclassified function area	360	(5%)	0	(0%)	8	(8%)	$1	(10%)
Unclassified area of origin	250	(4%)	0	(0%)	0	(0%)	$0	(1%)
Unclassified equipment or service area	210	(3%)	0	(0%)	0	(0%)	$0	(0%)
Other known area of origin **	310	(4%)	4	(39%)	6	(7%)	$3	(21%)

Table 6.5. Home Structure Fires Starting With Ignition of Class II Combustible Liquid, 2007-2011 Annual Averages, by Area of Origin (Continued)

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Total	6,890	(100%)	10	(100%)	93	(100%)	$14	(100%)

* Does not include residential garage coded as separate property.

** Leading areas of origin for deaths not shown above are unclassified structural area (30% of deaths) and lobby or entrance way (9%).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Area of Origin reported as unknown or blank.

Source: NFIRS and NFPA survey.

Table 6-6. Non-Home Structure Fires Starting With Ignition of Class II Combustible Liquid, 2007-2011 Annual Averages, by Major Property Use Group

Property Use Group	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Stores and offices	400	(26%)	1	(33%)	5	(30%)	$1	(6%)
Public assembly	230	(15%)	0	(0%)	0	(0%)	$0	(1%)
Residential	220	(15%)	1	(45%)	3	(23%)	$1	(11%)
Educational	160	(10%)	0	(0%)	0	(0%)	$0	(0%)
Outside or special property	100	(7%)	0	(0%)	2	(11%)	$1	(10%)
Storage	90	(6%)	0	(22%)	0	(3%)	$2	(13%)
Manufacturing	60	(4%)	0	(0%)	0	(0%)	$3	(29%)
Health care or correction	50	(3%)	0	(0%)	1	(3%)	$0	(0%)
Industrial, utility, defense, agriculture, or mining	30	(2%)	0	(0%)	0	(0%)	$3	(27%)
Unclassified	10	(0%)	0	(0%)	1	(3%)	$0	(1%)
None or undetermined	180	(12%)	0	(0%)	4	(26%)	$0	(1%)
Total	1,530	(100%)	2	(100%)	15	(100%)	$12	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars.

Source: NFIRS and NFPA survey.

Table 6-7. Non-Home Structure Fires Starting With Ignition of Class II Combustible Liquid, by Year

Year	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions) as Reported	in 2011 Dollars
1980	3,050	0	58	$22	$60
1981	2,730	3	98	$31	$75
1982	2,680	0	83	$31	$71
1982	2,220	11	73	$27	$62
1984	2,490	2	70	$29	$62
1985	2,630	4	52	$39	$82
1986	2,290	9	76	$40	$81
1987	2,140	0	33	$29	$58
1988	1,760	15	65	$44	$85
1989	2,240	4	56	$41	$74
1990	1,770	8	57	$27	$46
1991	1,560	0	39	$22	$37
1992	1,440	8	35	$46	$74
1993	1,260	0	27	$23	$36
1994	1,180	0	36	$53	$81
1995	1,130	8	41	$60	$88
1996	1,080	5	37	$15	$21
1997	1,020	2	29	$23	$32
1998	850	3	29	$17	$23
1999	1,840	0	0	$3	$4
2000	1,340	0	70	$15	$20
2001	1,270	0	10	$18	$22
2002	1,720	0	21	$11	$13
2003	2,510	0	21	$11	$14
2004	2,660	7	37	$14	$17
2005	1,790	2	5	$15	$17
2006	1,760	0	0	$8	$9
2007	1,480	0	12	$6	$7
2008	1,690	8	28	$6	$6
2009	1,960	0	0	$34	$36
2010	1,500	0	26	$8	$8
2011	1,060	3	5	$5	$5

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Also, because participation in NFIRS Version 5.0 was low in the early years (1999-2001), those estimates are especially volatile. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars.

Source: NFIRS and NFPA survey. Inflation adjustments based on consumer price index.

Table 6-8. Non-Home Structure Fires Starting With Ignition of Class II Combustible Liquid, 2007-2011 Annual Averages, by Heat Source

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Spark, ember or flame from operating equipment	530	(35%)	1	(45%)	4	(25%)	$2	(18%)
Unclassified heat from powered equipment	490	(32%)	0	(0%)	3	(23%)	$6	(55%)
Unclassified heat source	160	(11%)	0	(0%)	0	(0%)	$0	(1%)
Radiated or conducted heat from operating equipment	120	(8%)	0	(0%)	2	(15%)	$1	(8%)
Backfire from internal combustion engine	40	(2%)	0	(0%)	0	(0%)	$0	(0%)
Flame or torch used for lighting	30	(2%)	0	(22%)	1	(6%)	$0	(4%)
Unclassified hot or smoldering object	20	(1%)	0	(0%)	0	(0%)	$0	(0%)
Cigarette lighter	20	(1%)	0	(0%)	0	(0%)	$0	(1%)
Match	20	(1%)	0	(0%)	0	(0%)	$0	(0%)
Arcing	10	(1%)	1	(33%)	0	(0%)	$1	(6%)
Heat or spark from friction	10	(1%)	0	(0%)	0	(3%)	$0	(2%)
Heat from direct flame or convection currents	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Conducted heat from another fire	10	(1%)	0	(0%)	3	(18%)	$0	(0%)
Candle	10	(1%)	0	(0%)	1	(6%)	$0	(0%)
Other known heat source	40	(3%)	0	(0%)	1	(4%)	$1	(5%)
Total	1,530	(100%)	2	(100%)	15	(100%)	$12	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. Separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Heat Source reported as unknown or blank. Estimates for smoking material, match, lighter, candle, and other open flame sources include proportional shares of fires reported with Heat Source as "other" heat from open flame or smoking material.

Source: NFIRS and NFPA survey.

Table 6-9. Non-Home Structure Fires Starting With Ignition of Class II Combustible Liquid, 2007-2011 Annual Averages, by Equipment Involved in Ignition

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Central heating unit	830	(54%)	*	(*)	5	(31%)	$1	(7%)
Portable or stationary space heater	380	(25%)	*	(*)	3	(23%)	$4	(38%)
Water heater	90	(6%)	*	(*)	0	(0%)	$0	(0%)
No equipment involved	90	(6%)	*	(*)	7	(46%)	$1	(6%)
Torch, burner or soldering equipment	60	(4%)	*	(*)	0	(0%)	$1	(8%)
Industrial furnace or kiln	20	(1%)	*	(*)	0	(0%)	$2	(17%)
Internal combustion engine (non-vehicular)	20	(1%)	*	(*)	0	(0%)	$0	(0%)
Unclassified equipment involved in ignition	10	(1%)	*	(*)	0	(0%)	$1	(7%)
Other known equipment*	20	(2%)	*	(*)	0	(0%)	$2	(16%)
Total	1,530	(100%)	2	(100%)	15	(100%)	$12	(100%)

* Cannot be calculated because all deaths are in fires with equipment involved in ignition unknown.

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Reports of no equipment involved are treated as unknown equipment unless Heat Source is coded as 40-99, indicating a known non-equipment Heat Source. Also, equipment reported with a code ending in two zeros is treated as a partial unknown and proportionally allocated (e.g., unclassified or unknown type cooking equipment.

Source: NFIRS and NFPA survey.

Table 6-10. Non-Home Structure Fires Starting With Ignition of Class II Combustible Liquid, 2007-2011 Annual Averages, by Factor Contributing to Ignition

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Unclassified mechanical failure or malfunction	780	(51%)	1	(45%)	3	(20%)	$3	(29%)
Backfire	150	(10%)	0	(0%)	0	(0%)	$0	(1%)
Automatic control failure	100	(7%)	0	(0%)	0	(0%)	$0	(1%)
Improper startup	60	(4%)	0	(0%)	2	(11%)	$0	(1%)
Flammable liquid or gas spilled	40	(3%)	0	(0%)	1	(9%)	$1	(11%)
Leak or break	40	(3%)	0	(0%)	2	(11%)	$1	(8%)
Unclassified operational deficiency	40	(3%)	1	(45%)	2	(13%)	$0	(1%)
Flammable liquid used to kindle fire	40	(3%)	0	(0%)	0	(0%)	$0	(1%)
Equipment not being operated properly	40	(2%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified misuse of material or product	40	(2%)	0	(0%)	1	(9%)	$0	(2%)
Failure to clean	40	(2%)	0	(0%)	1	(4%)	$0	(1%)
Worn out	30	(2%)	0	(0%)	0	(0%)	$0	(2%)
Heat source too close to combustibles	30	(2%)	0	(0%)	2	(12%)	$1	(9%)
Equipment unattended	20	(2%)	0	(0%)	1	(9%)	$0	(1%)
Cutting or welding too close to combustible	20	(1%)	0	(0%)	0	(0%)	$0	(4%)
Manual control failure	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified electrical failure or malfunction	10	(1%)	0	(0%)	0	(0%)	$1	(5%)
Unclassified factor contributed to ignition	10	(1%)	0	(0%)	0	(0%)	$1	(5%)
Exposure fire	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Equipment overloaded	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Other known factor*	40	(3%)	1	(55%)	3	(17%)	$3	(26%)
Total	1,530	(100%)	2	(100%)	15	(100%)	$12	(100%)
Total factors	1,570	(103%)	3	(145%)	17	(116%)	$13	(108%)
All electrical failures or malfunctions	20	(1%)	0	(0%)	0	(0%)	$2	(21%)

Table 6-10. Non-Home Structure Fires Starting With Ignition of Class II Combustible Liquid, 2007-2011 Annual Averages, by Factor Contributing to Ignition (Continued)

* Leading factors for deaths not shown above are washing part or painting with flammable liquid (33% of deaths) and improper fueling technique (22%).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Factor Contributing to Ignition reported as none, unknown, or blank.

Source: NFIRS and NFPA survey.

Table 6-11. Non-Home Structure Fires Starting With Ignition of Class II Liquid, 2007-2011 Annual Averages, by Area of Origin

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Heating equipment room	900	(59%)	0	(0%)	3	(18%)	$0	(4%)
Duct for HVAC, cable, exhaust, heating, or air conditioning	110	(7%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified equipment or service area	60	(4%)	0	(0%)	1	(4%)	$4	(34%)
Maintenance or paint shop or area	50	(4%)	1	(33%)	0	(0%)	$0	(2%)
Crawl space or substructure space	50	(3%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified area of origin	40	(3%)	0	(0%)	0	(0%)	$0	(0%)
Garage*	40	(2%)	0	(22%)	0	(0%)	$1	(9%)
Unclassified function area	30	(2%)	0	(0%)	2	(15%)	$0	(4%)
Unclassified storage area	20	(1%)	0	(0%)	0	(0%)	$0	(2%)
Kitchen	20	(1%)	1	(45%)	5	(33%)	$0	(2%)
Unclassified service facility	20	(1%)	0	(0%)	0	(0%)	$0	(0%)
Processing or manufacturing area or workroom	20	(1%)	0	(0%)	0	(0%)	$0	(0%)
Storage of supplies or tools	20	(1%)	0	(0%)	0	(3%)	$0	(1%)
Unclassified outside area	10	(1%)	0	(0%)	1	(3%)	$0	(1%)
On or near highway, public way or street	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Trash or rubbish chute, area or container	10	(1%)	0	(0%)	2	(11%)	$0	(0%)
Construction or renovation area	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Heating equipment room	900	(59%)	0	(0%)	3	(18%)	$0	(4%)
Other known area of origin	110	(7%)	0	(0%)	2	(12%)	$5	(40%)
Total	1,530	(100%)	2	(100%)	15	(100%)	$12	(100%)

* May not include or be limited to garages coded as property use.

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires Area of Origin reported as unknown, or blank.
Source: NFIRS and NFPA survey.

During 2007-2011, an average of 60,650 fires per year were reported as having begun with the ignition of gasoline as the type of material first ignited.
These fires caused an average of 277 civilian deaths per year, 1,125 civilian injuries per year, and $456 million in direct property damage per year.

Tables 7-A.1, 7-A.2, and 7-A.3 show how these fires divide, first into fires at home versus any other property use, and within those two groups, into structure, vehicle, and outdoor or other fires. Nearly all home losses are in structure fires, but nearly half of the fires are not in structure fires. Vehicle fires are a much larger share of non-home fires than home fires.

Table 7-A.1. Fires Starting With Ignition of Gasoline
2007-2011 Annual Averages, by Property Use

Property Use	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Home	7,960	(13%)	106	(38%)	432	(38%)	$136	(30%)
Other property use	52,690	(87%)	171	(62%)	693	(62%)	$320	(70%)
Total	60,650	(100%)	277	(100%)	1,125	(100%)	$456	(100%)

Note: See text box on p. 128 for details on calculations. Source: NFIRS and NFPA survey.

Table 7-A.2. Home First Starting With Ignition of Gasoline
2007-2011 Annual Averages, by Incident Type

Incident Type	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Structure fire	2,410	(30%)	101	(95%)	325	(75%)	$125	(91%)
Vehicle fire	2,960	(33%)	4	(4%)	73	(17%)	$11	(9%)
Outdoor or other fire	2,590	(37%)	1	(1%)	34	(8%)	$1	(0%)
Total	7,960	(100%)	106	(100%)	432	(100%)	$136	(100%)

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

Table 7-A.3. Non-Home Fires Starting With Ignition of Gasoline
2007-2011 Annual Averages, by Incident Type

Incident Type	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Structure fire	1,790	(3%)	21	(12%)	157	(23%)	$102	(32%)
Vehicle fire	39,920	(76%)	143	(84%)	475	(59%)	$193	(60%)
Outdoor or other fire	10,990	(21%)	7	(4%)	61	(9%)	$25	(8%)
Total	52,690	(100%)	171	(100%)	693	(100%)	$320	(100%)

Note: See text box for details on calculations. Source: NFIRS and NFPA survey.

Data Sources, Definitions and Conventions Used in This Section

Unless otherwise specified, the statistics in this analysis are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to federal or state agencies or industrial fire brigades. These estimates are projections based on the detailed information collected in Version 5.0 of the U.S. Fire Administration's National Fire Incident Reporting System (NFIRS 5.0) and the National Fire Protection Association's (NFPA's) annual fire department experience survey. In general, any fire that occurs in or on a structure is considered a structure fire, even if the fire was limited to contents and the building itself was not damaged.

"Home" includes one- and two-family homes, manufactured homes, and multi-family housing, including apartments.

Flammable and combustible liquids are identified in NFIRS 5.0 Type of Material First Ignited:
20 – Unclassified or unknown type flammable or combustible liquid. Corresponds to codes 20 (unknown) and 29 (unclassified) in earlier versions of NFIRS.
21 – Class IA flammable liquid, including ethyl ether and pentane.
22 – Class IB flammable liquid, including acetone, ethanol alcohol, and methyl-ethyl-ketone.
23 – Gasoline.
24 – Class IC flammable liquid, including turpentine and butyl alcohol.
25 –.Class II combustible liquid, including kerosene, diesel, paint thinner, and Nos. 1 and 2 fuel oil. No. 2 fuel oil includes what was once the separate category of No. 3 fuel oil.
26 – Class IIIA combustible liquid, including cottonseed oil, produced creosote oil, and Nos. 4, 5 and 6 fuel oil. Creosote oil is primarily introduced into buildings when wood burns incompletely.
27 – Class IIIB combustible liquid, including cooking oil, transformer oil, and lubricating oil.
28 – Ethanol, added in 2008.

NFIRS 5.0 includes a category of structure fires collectively referred to as "confined fires," identified by incident type. These include confined cooking fires, confined chimney or flue fires, confined trash fires, confined fuel burner or boiler fires, confined commercial compactor fires, and confined incinerator fires (incident type 113-118). Losses are generally minimal in these fires, which by definition, are assumed to have been limited to the object of origin. Although detailed data is not required for these fires, it is sometimes present.

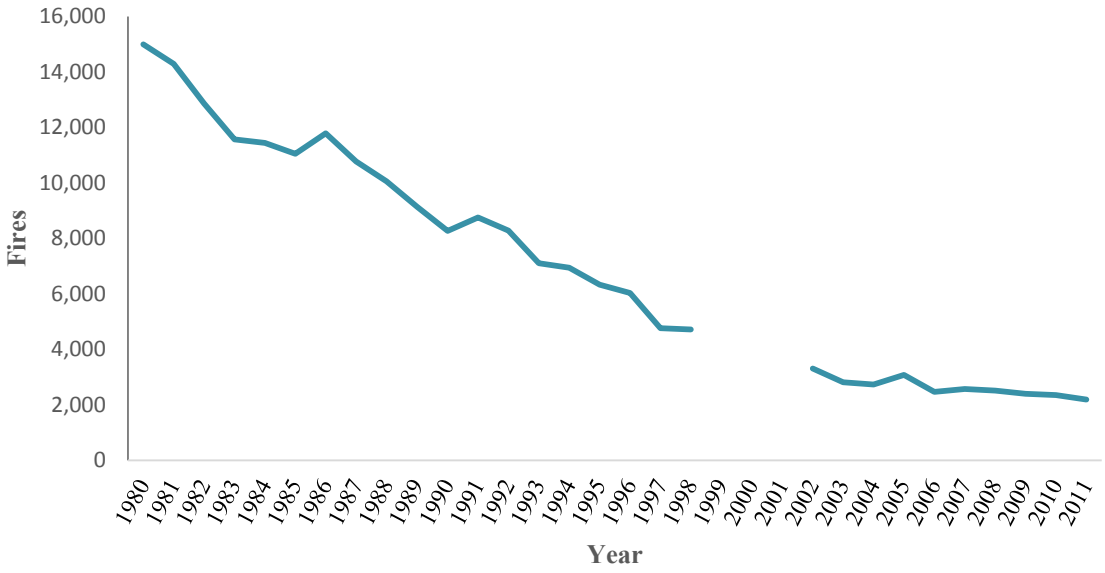
Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Property damage has not been adjusted for inflation. Fires are rounded to the nearest ten, civilian deaths and injuries to the nearest one, and direct property damage to the nearest million. Additional details on the methodology may be found in Appendix A.

Reporting of Type of Material First Ignited is not required if Item First Ignited is coded in the range of 70 to 99. As with confined fires, the field is nevertheless reported for many fires, but the percentage of unknowns and blanks is higher. Fires are analyzed separately for (1) non-confined structure fires, (2) confined structure fires, (3) vehicle fires, (4) outdoor or other vegetation fires, and (5) outdoor or other non-vegetation fires (principally trash). For each of these, fires are analyzed separately for Item First Ignited 70-99 and Item First Ignited not 70-99.

A. Homes

Gasoline home structure fires declined substantially from 1980 to 1998 and have continued to decline in recent years.
Table 7-1 and Figure 7-1 show the trends in home fires starting with ignition of gasoline, from 1980 to 2011. Fires dropped by two-thirds from 1980 to 1998, then continued to decline after NFIRS Version 5.0 was introduced. Since then, fires have declined by nearly half.

Figure 7-1. Home Structure Fires Starting With Ignition of Gasoline



Note: See Note on Table 7-1. Source: NFIRS and NFPA survey.

Intentional fires accounted for half (52%) of home gasoline structure fires.

Intentional home structure fires starting with ignition of gasoline rarely involve equipment as a heat source, while other home structure fires starting with ignition of gasoline are a mix of fires with and without equipment as the heat source.
Table 7-2 shows that three of the four leading heat sources do not involve equipment – match, lighter, and incendiary device. These devices accounted for 43% of home gasoline structure fires, 77% of intentional home gasoline structure fires, and 13% of non-intentional home gasoline structure fires.

When equipment is the heat source, Table 7-3 shows that the leading types of equipment are a mix of equipment commonly powered by gasoline, such as lawn mowers, and equipment where fueling with gasoline would normally constitute misuse, such as water heater or space heater. Three of five (63%) home gasoline structure fires show no equipment involved in ignition. No equipment was also involved in 96% of intentional home gasoline structure fires and 32% of non-intentional home structure gasoline fires.

Note that when equipment ignites gasoline the gasoline ignited may not have been in use by the equipment that ignited the gasoline. In fact, pilot lights for equipment that is not turned on can serve as a heat source for vapors from gasoline spilling, leaking or otherwise released near the pilot light, as can hot surfaces from any operating equipment near the released liquid.

Half (50%) of home structure fires starting with ignition of gasoline had one of these three types of error or misuse as a factor contributing to ignition – spill (18%), kindling of a fire (17%), or unclassified misuse of material or product (15%).
These factors accounted for 67% of intentional home gasoline structure fires – kindling (30%), unclassified misuse of material or product (26%), and spill (11%). These factors accounted for 37% of non-intentional home gasoline structure fires – spill (24%), unclassified misuse of product or material (7), and kindling (6%). Table 7-4 shows the leading factors contributing to ignition. Playing with fire accounts for 5% of these fires, 8% of the intentional fires, and 2% of the non-intentional fires. Other leading factors for non-intentional home structure gasoline fires are heat source too close to combustibles (16%) and improper container or storage (8%).

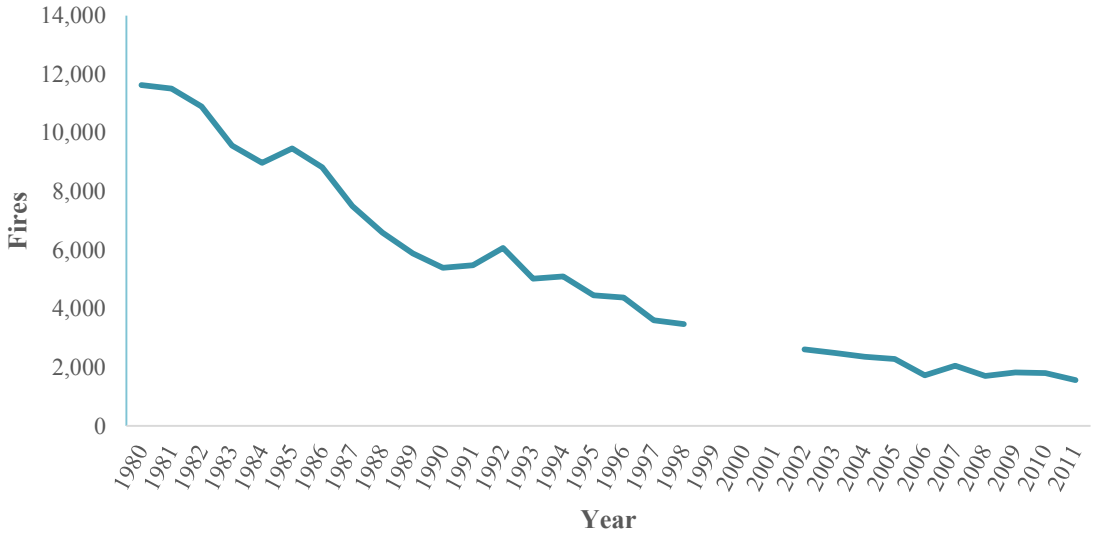
One-fifth (20%) of home structure fires starting with ignition of gasoline began in the garage.
This is the area where most home equipment fueled by gasoline will be stored. Table 7-5 shows the leading areas of origin. Garages accounted for only 6% of intentional home gasoline structure fires, where the leading areas of origin were exterior wall surface (10%), multiple area of origin (9%), and living room, family room or den (9%). Garages accounted for 37% of non-intentional home gasoline structure fires.

B. Properties Other Than Homes

Over half (57%) of non-home structure fires starting with ignition of gasoline occur at storage (41%) or outside or special (16%) properties, which are not properties cited in large shares of fires for any other type of flammable gas or flammable or combustible liquid.
Storage properties include garages for vehicles, most of which are gasoline-fueled, and for other gasoline-powered equipment, such as lawn mowers. Outside or special properties include roads, highways, and parking lots, which are also associated with vehicles. Table 7-6 shows the shares of these fires by major property use group.

Gasoline non-home structure fires declined substantially from 1980 to 1998 but have shown a slower rate of decline in recent years.
Table 7-7 and Figure 7-2 show the trends in non-home fires starting with ignition of gasoline, from 1980 to 2011. Fires dropped by roughly two-thirds from 1980 to 1998, then continued to decline after NFIRS Version 5.0 was introduced.

Figure 7-2. Non-Home Structure Fires Starting With Ignition of Gasoline



Note: See Note on Table 7-1. Source: NFIRS and NFPA survey.

Intentional fires accounted for 32% of non-home gasoline structure fires.

Intentional non-home structure fires starting with ignition of gasoline rarely involve equipment as a heat source, while other non-home structure fires starting with ignition are a mix of fires with and without equipment as the heat source.
Table 7-8 shows that two of the three leading heat sources do not involve equipment – lighter and match. These devices accounted for 22% of non-home gasoline structure fires, 60% of intentional non-home gasoline structure fires, and 6% of non-intentional, non-home gasoline structure fires. Table 7-9 shows that half (48%) of the non-home gasoline structure fires had no equipment involved. No equipment was involved in 89% of intentional, non-home gasoline structure fires and 31% of non-intentional non-home structure fires. Yard equipment (including snow blower), with 10% of non-home gasoline structure fires, had the largest equipment share.

Note that when equipment ignites gasoline, the gasoline ignited may not have been in use by the equipment that ignited the gasoline. In fact, pilot lights for equipment that is not turned on can serve as a heat source for vapors from gasoline spilled, leaking or otherwise released near the pilot light, as can hot surfaces from any operating equipment near the released gasoline.

Half (49%) of non-home structure fires starting with ignition of a gasoline involved one of four errors – a spill (19%), insufficient separation between combustibles and heat source (11%), unclassified misuse of material (10%), or use of liquid to kindle fire (9%) – as a factor contributing to ignition.
Table 7-10 shows the leading factors contributing to ignition. These four factors accounted for 64% of intentional, non-home gasoline structure fires – kindling (28%), unclassified misuse of material or product (23%), spill (11%), and insufficient separation (2%). These factors accounted for 42% of non-intentional, non-home gasoline structure fires – spill (21%),

insufficient separation (13%), unclassified misuse of material or product (5%), and kindling (3%).

One-fifth (22%) of non-home structure fires starting with ignition of gasoline began in a garage.
This is the area where most gasoline-fueled equipment would be stored. Table 7-11 shows the leading areas of origin. Garages accounted for 10% of intentional, non-home gasoline structure fires, where unclassified outside area accounted for another 10%, and exterior wall surface accounted for 8%. Garages accounted for 28% of non-intentional, non-home gasoline structure fires, with a comparable additional share of these fires starting in various areas in or on a vehicle.

Table 7-1. Home Structure Fires Starting With Ignition of Gasoline, by Year

Year	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions) as Reported	in 2011 Dollars
1980	15,000	227	1,491	$106	$289
1981	14,290	232	1,361	$116	$286
1982	12,860	234	1,443	$98	$227
1983	11,570	226	1,405	$124	$279
1984	11,450	138	1,404	$126	$272
1985	11,050	189	1,162	$124	$258
1986	11,790	166	1,240	$129	$264
1987	10,770	173	1,204	$112	$222
1988	10,060	164	1,196	$125	$238
1989	9,140	160	1,069	$121	$220
1990	8,270	122	889	$127	$218
1991	8,760	154	960	$179	$295
1992	8,280	160	893	$100	$160
1993	7,110	188	847	$110	$171
1994	6,950	102	650	$99	$151
1995	6,340	131	662	$102	$150
1996	6,040	119	649	$107	$154
1997	4,760	138	525	$84	$117
1998	4,720	86	463	$92	$127
1999	3,900	207	272	$82	$110
2000	4,090	125	447	$107	$140
2001	3,770	23	481	$98	$124
2002	3,310	65	311	$102	$127
2003	2,820	118	311	$93	$113
2004	2,730	141	300	$93	$111
2005	3,080	127	418	$147	$169
2006	2,470	76	314	$118	$132
2007	2,570	153	390	$151	$164
2008	2,520	124	338	$120	$125
2009	2,400	89	272	$126	$132
2010	2,360	61	311	$107	$110
2011	2,190	75	308	$120	$120

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Also, because participation in NFIRS Version 5.0 was low in the early years (1999-2001), those estimates are especially volatile. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars.

Source: NFIRS and NFPA survey. Inflation adjustments based on consumer price index.

Table 7-2. Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Heat Source

A. All Gasoline Fires

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Match	430	(18%)	30	(30%)	32	(10%)	$15	(12%)
Cigarette lighter	390	(16%)	34	(34%)	69	(21%)	$22	(17%)
Spark, ember or flame from operating equipment	370	(15%)	10	(10 %)	85	(26%)	$25	(20%)
Incendiary device	210	(9%)	1	(1%)	3	(1%)	$5	(4%)
Unclassified heat from powered equipment	160	(7%)	0	(0%)	15	(4%)	$9	(7%)
Unclassified heat source	130	(5%)	6	(6%)	16	(5%)	$6	(5%)
Flame or torch used for lighting	90	(4%)	3	(3%)	10	(3%)	$6	(4%)
Smoking material	70	(3%)	1	(1%)	9	(3%)	$3	(2%)
Multiple heat sources	70	(3%)	5	(5%)	3	(1%)	$4	(3%)
Heat from direct flame or convection currents	70	(3%)	1	(1%)	5	(2%)	$2	(2%)
Arcing	60	(3%)	1	(1%)	21	(7%)	$5	(4%)
Radiated or conducted heat from operating equipment	60	(3%)	2	(2%)	15	(5%)	$5	(4%)
Hot ember or ash	60	(3%)	2	(2%)	6	(2%)	$1	(1%)
Backfire from internal combustion engine	40	(2%)	0	(0%)	2	(1%)	$4	(3%)
Unclassified hot or smoldering object	40	(2%)	0	(0%)	9	(3%)	$6	(5%)
Heat or spark from friction	20	(1%)	0	(0%)	3	(1%)	$1	(1%)
Candle	20	(1%)	0	(0%)	6	(2%)	$1	(1%)
Radiated heat from another fire	20	(1%)	0	(0%)	2	(1%)	$1	(1%)
Molten or hot material	20	(1%)	0	(0%)	1	(0%)	$0	(0%)
Unclassified heat spread from another fire	10	(1%)	0	(0%)	4	(1%)	$1	(1%)
Other known heat source	50	(2%)	4	(4%)	9	(3%)	$2	(2%)
Total	2,410	(100%)	101	(100%)	325	(100%)	$125	(100%)

Table 7-2. Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Heat Source (Continued)

B. Intentional Fires

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Match	390	(31%)	24	(32%)	27	(27%)	$15	(25%)
Cigarette lighter	350	(28%)	33	(45%)	44	(45%)	$21	(35%)
Incendiary device	220	(18%)	1	(2%)	3	(3%)	$6	(10%)
Flame or torch used for lighting	60	(5%)	1	(2%)	6	(6%)	$5	(8%)
Multiple heat sources	60	(5%)	6	(8%)	3	(3%)	$4	(7%)
Unclassified heat source	60	(4%)	3	(4%)	5	(5%)	$3	(6%)
Smoking materials	30	(2%)	0	(0%)	2	(2%)	$1	(2%)
Heat from direct flame or convection currents	20	(2%)	1	(2%)	2	(2%)	$0	(1%)
Spark, ember or flame from operating equipment	10	(1%)	0	(0%)	2	(2%)	$1	(1%)
Candle	10	(1%)	0	(0%)	1	(1%)	$0	(0%)
Unclassified hot or smoldering object	10	(1%)	0	(0%)	0	(0%)	$0	(1%)
Other known heat source*	30	(3%)	4	(6%)	5	(5%)	$2	(3%)
Total	1,260	(100%)	74	(100%)	98	(100%)	$60	(100%)

* Leading heat source for deaths ot shown above is unclassified chemical or natural heat source (6%).

C. Fires That Were Not Intentional

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Spark, ember or flame from operating equipment	330	(29%)	10	(35%)	82	(36%)	$19	(29%)
Unclassified heat from powered equipment	140	(12%)	0	(0%)	14	(6%)	$7	(11%)
Unclassified heat source	70	(6%)	3	(12%)	11	(5%)	$3	(4%)
Match	70	(6%)	5	(19%)	5	(2%)	$2	(2%)
Cigarette lighter	70	(6%)	0	(0%)	27	(12%)	$3	(5%)
Arcing	60	(5%)	1	(5%)	21	(9%)	$4	(7%)
Radiated or conducted heat from operating equipment	60	(5%)	1	(4%)	15	(6%)	$5	(8%)

Table 7-2. Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Heat Source (Continued)

C. Fires That Were Not Intentional

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Hot ember or ash	50	(4%)	2	(9%)	5	(2%)	$1	(2%)
Smoking materials	50	(4%)	2	(8%)	10	(5%)	$2	(2%)
Backfire from internal combustion engine	50	(4%)	0	(0%)	2	(1%)	$5	(8%)
Heat from direct flame or convection currents	40	(4%)	0	(0%)	4	(2%)	$2	(3%)
Unclassified hot or smoldering object	30	(3%)	0	(0%)	9	(4%)	$5	(8%)
Flame or torch used for lighting	30	(3%)	2	(8%)	5	(2%)	$1	(2%)
Heat or spark from friction	20	(2%)	0	(0%)	3	(1%)	$1	(2%)
Radiated heat from another fire	20	(1%)	0	(0%)	1	(0%)	$0	(0%)
Molten or hot material	10	(1%)	0	(0%)	1	(0%)	$0	(1%)
Candle	10	(1%)	0	(0%)	5	(2%)	$1	(2%)
Unclassified heat spread from another fire	10	(1%)	0	(0%)	1	(1%)	$1	(1%)
Incendiary device	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified static discharge	10	(1%)	0	(0%)	3	(1%)	$0	(0%)
Chemical reaction	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Other known heat source	20	(2%)	0	(0%)	4	(2%)	$1	(2%)
Total	1,150	(100%)	27	(100%)	227	(100%)	$65	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. Separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Also, because participation in NFIRS Version 5.0 was low in the early years (1999-2001), those estimates are especially volatile. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Heat Source reported as unknown or blank. Estimates for smoking material, match, lighter, candle, and other open flame sources include proportional shares of fires reported with Heat Source as "other" heat from open flame or smoking materials.

Source: NFIRS and NFPA survey.

Table 7-3. Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Equipment Involved in Ignition

A. All Gasoline Fires

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
No equipment involved	1,520	(63%)	68	(67%)	136	(42%)	$59	(48%)
Water heater	240	(10%)	12	(12%)	67	(21%)	$23	(18%)
Yard equipment including snow blower*	130	(5%)	4	(4%)	8	(2%)	$7	(6%)
Portable or stationary space heater	110	(4%)	4	(4%)	23	(7%)	$5	(4%)
Transformer or power supply	70	(3%)	5	(5%)	16	(5%)	$6	(5%)
Unclassified equipment	50	(2%)	0	(0%)	6	(2%)	$3	(2%)
Grill, hibachi, or barbecue	40	(2%)	0	(0%)	3	(1%)	$1	(1%)
Cigarette lighter	20	(1%)	0	(0%)	8	(2%)	$1	(1%)
Lamp or light fixture	20	(1%)	0	(0%)	9	(3%)	$4	(3%)
Internal combustion engine	20	(1%)	0	(0%)	0	(0%)	$1	(1%)
Power saw	20	(1%)	0	(0%)	1	(0%)	$0	(0%)
Torch, burner or soldering equipment	20	(1%)	0	(0%)	7	(2%)	$6	(5%)
Unclassified portable appliance designed to produce heat	20	(1%)	0	(0%)	3	(1%)	$1	(0%)
Washer or dryer	10	(1%)	0	(0%)	2	(1%)	$0	(0%)
Other known equipment**	120	(5%)	9	(8%)	38	(12%)	$9	(7%)
Total	2,410	(100%)	101	(100%)	325	(100%)	$125	(100%)

* Most equipment involving yard equipment specifically involved lawnmower, with snow blower having the next largest share.

** Leading equipment for deaths not shown above are range (4% of deaths) and central heating unit (4%).

Table 7-3. Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Equipment Involved in Ignition (Continued)

B. Intentional Fires

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
No equipment involved	1,200	(96%)	69	(93%)	89	(91%)	$51	(85%)
Cigarette lighter	20	(2%)	0	(0%)	7	(7%)	$1	(1%)
Lawn mower	10	(1%)	0	(0%)	2	(2%)	$0	(0%)
Other known equipment*	30	(2%)	5	(7%)	0	(0%)	$8	(14%)
Total	1,260	(100%)	74	(100%)	98	(100%)	$60	(100%)

* Leading equipment involved in deaths not cited above is water heater (7%).

C. Fires That Were Not Intentional

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
No equipment involved	360	(32%)	6	(22%)	49	(22%)	$14	(22%)
Water heater	230	(20%)	6	(21%)	68	(30%)	$20	(30%)
Portable or stationary space heater	100	(8%)	3	(12%)	16	(7%)	$3	(5%)
Lawn mower	90	(8%)	0	(0%)	4	(2%)	$6	(9%)
Transformer or power supply	60	(5%)	3	(12%)	16	(7%)	$5	(8%)
Unclassified equipment involved in ignition	40	(3%)	0	(0%)	6	(3%)	$2	(3%)
Grill, hibachi, or barbecue	40	(3%)	0	(0%)	3	(1%)	$1	(1%)
Light fixture or lamp	20	(2%)	0	(0%)	10	(4%)	$4	(5%)
Internal combustion engine	20	(2%)	0	(0%)	0	(0%)	$1	(1%)
Power saw	20	(1%)	0	(0%)	1	(0%)	$0	(0%)
Torch, burner or soldering equipment	10	(1%)	0	(0%)	7	(3%)	$1	(1%)
Washer or dryer	10	(1%)	0	(0%)	2	(1%)	$0	(0%)
Unclassified gardening tool or agricultural equipment	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Fireplace, chimney or connector	10	(1%)	0	(0%)	8	(3%)	$3	(4%)
Range with or without oven	10	(1%)	3	(12%)	6	(3%)	$0	(0%)
Snow blower	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Pump	10	(1%)	0	(0%)	0	(0%)	$0	(0%)

Table 7-3. Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Equipment Involved in Ignition (Continued)

C. Fires That Were Not Intentional

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Refrigerator, freezer or ice maker	10	(1%)	0	(0%)	0	(0%)	$1	(2%)
Wet/dry vacuum	10	(1%)	0	(0%)	7	(3%)	$0	(0%)
Power sander, grinder, buffer, or polisher	10	(1%)	0	(0%)	4	(2%)	$0	(0%)
Central heating unit	10	(1%)	3	(11%)	0	(0%)	$1	(1%)
Cord or plug	10	(1%)	0	(0%)	2	(1%)	$1	(1%)
Other known equipment*	70	(6%)	3	(11%)	19	(9%)	$2	(4%)
Total	1,150	(100%)	27	(100%)	227	(100%)	$65	(100%)

* Leading equipment for deaths not shown above is yard equipment (11%).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Equipment Involved in Ignition reported as unknown or blank. Reports of no equipment involved are treated as unknown equipment unless Heat Source is coded as 40-99, indicating a known non-equipment Heat Source. Also, equipment reported with a code ending in two zeros is treated as a partial unknown and proportionally allocated (e.g., unclassified or unknown type cooking equipment.

Source: NFIRS and NFPA survey.

Table 7-4. Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Factor Contributing to Ignition

A. All Gasoline Fires

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Flammable liquid or gas spilled	440	(18%)	32	(32%)	93	(29%)	$36	(29%)
Flammable liquid used to kindle fire	410	(17%)	22	(22%)	40	(12%)	$18	(14%)
Unclassified misuse of material	370	(15%)	22	(22%)	56	(17%)	$17	(13%)
Unclassified factor contributed to ignition	290	(12%)	30	(29%)	32	(10%)	$16	(13%)
Heat source too close to combustibles	220	(9%)	1	(1%)	29	(9%)	$10	(8%)
Improper container or storage	110	(5%)	4	(4%)	12	(4%)	$6	(5%)
Playing with heat source	110	(5%)	1	(1%)	22	(7%)	$1	(1%)
Improper fueling technique	100	(4%)	0	(0%)	19	(6%)	$3	(3%)
Leak or break	90	(4%)	0	(0%)	13	(4%)	$7	(6%)
Unclassified mechanical failure or malfunction	70	(3%)	0	(0%)	5	(2%)	$6	(5%)
Exposure fire	60	(3%)	0	(0%)	0	(0%)	$2	(2%)
Abandoned or discarded material	50	(2%)	0	(0%)	0	(0%)	$2	(2%)
Backfire	40	(2%)	0	(0%)	4	(1%)	$2	(1%)
Cutting or welding too close to combustible	40	(2%)	0	(0%)	8	(2%)	$1	(1%)
Arc or spark from operating equipment	20	(1%)	1	(1%)	6	(2%)	$2	(2%)
Washing part or painting with flammable liquid	20	(1%)	0	(0%)	11	(3%)	$1	(1%)
Collision, knock down, or turn over	20	(1%)	3	(3%)	3	(1%)	$1	(1%)
Improper startup	20	(1%)	0	(0%)	0	(0%)	$0	(0%)
Improper fuel used	10	(1%)	0	(0%)	5	(2%)	$0	(0%)
Unclassified operational deficiency	10	(1%)	0	(0%)	2	(0%)	$1	(0%)
Equipment unattended	10	(1%)	0	(0%)	1	(0%)	$0	(0%)
Unspecified short circuit arc	10	(1%)	0	(0%)	2	(1%)	$1	(1%)
Other known factor	80	(3%)	2	(2%)	6	(2%)	$4	(3%)
Total	2,410	(100%)	101	(100%)	325	(100%)	$125	(100%)
Total factors	2,610	(108%)	119	(117%)	372	(114%)	$140	(112%)

Table 7-4. Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Factor Contributing to Ignition (Continued)

A. All Gasoline Fires

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
All electrical failures or malfunctions	50	(2%)	1	(1%)	10	(3%)	$5	(4%)

B. Intentional Fires

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Flammable liquid used to kindle fire	380	(30%)	21	(28%)	21	(22%)	$18	(30%)
Unclassified misuse of material or product	320	(26%)	14	(19%)	26	(27%)	$16	(26%)
Unclassified factor contributed to ignition	290	(23%)	33	(44%)	24	(24%)	$17	(29%)
Flammable liquid or gas spilled	140	(11%)	20	(27%)	26	(27%)	$14	(23%)
Playing with heat source	90	(8%)	0	(0%)	8	(8%)	$1	(1%)
Abandoned or discarded material	40	(4%)	0	(0%)	0	(0%)	$1	(1%)
Improper fueling technique	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Heat source too close to combustibles	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Flammable liquid used to kindle fire	380	(30%)	21	(28%)	21	(22%)	$18	(30%)
Unclassified misuse of material or product	320	(26%)	14	(19%)	26	(27%)	$16	(26%)
Unclassified factor contributed to ignition	290	(23%)	33	(44%)	24	(24%)	$17	(29%)
Other known factor	30	(2%)	0	(0%)	5	(5%)	$1	(2%)
Total	1,260	(100%)	74	(100%)	98	(100%)	$60	(100%)
Total factors	1,320	(105%)	88	(119%)	110	(113%)	$68	(113%)
All electrical failures or malfunctions	0	(0%)	0	(0%)	1	(1%)	$0	(0%)

Table 7-4. Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Factor Contributing to Ignition (Continued)

C. Fires That Were Not Intentional

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Flammable liquid or gas spilled	280	(24%)	11	(42%)	67	(30%)	$21	(33%)
Heat source too close to combustibles	180	(16%)	1	(5%)	29	(13%)	$9	(14%)
Improper container or storage	90	(8%)	4	(14%)	13	(6%)	$5	(8%)
Unclassified misuse of material or product	90	(7%)	4	(14%)	29	(13%)	$4	(6%)
Flammable liquid used to kindle fire	70	(6%)	4	(15%)	18	(8%)	$3	(4%)
Leak or break	70	(6%)	0	(0%)	13	(6%)	$6	(9%)
Improper fueling technique	70	(6%)	0	(0%)	19	(8%)	$3	(5%)
Exposure fire	60	(5%)	0	(0%)	0	(0%)	$2	(3%)
Unclassified mechanical failure or malfunction	50	(5%)	0	(0%)	4	(2%)	$5	(7%)
Backfire	40	(3%)	0	(0%)	3	(1%)	$1	(2%)
Cutting or welding too close to combustible	30	(3%)	0	(0%)	7	(3%)	$1	(1%)
Unclassified factor contributed to ignition	30	(2%)	1	(5%)	8	(4%)	$2	(3%)
Playing with heat source	20	(2%)	1	(4%)	16	(7%)	$0	(1%)
Arc or spark from operating equipment	20	(2%)	1	(5%)	6	(3%)	$2	(3%)
Washing part or painting with flammable liquid	20	(1%)	0	(0%)	8	(4%)	$1	(1%)
Collision, knock down, or turn over	10	(1%)	3	(10%)	3	(1%)	$1	(2%)
Improper startup	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Abandoned or discarded material	10	(1%)	0	(0%)	0	(0%)	$1	(1%)
Unclassified operational deficiency	10	(1%)	0	(0%)	2	(1%)	$1	(1%)
Equipment unattended	10	(1%)	0	(0%)	1	(0%)	$0	(1%)
Unspecified short circuit arc	10	(1%)	0	(0%)	2	(1%)	$1	(1%)
Improper fuel used	10	(1%)	0	(0%)	2	(1%)	$0	(0%)
Unclassified electrical failure or malfunction	10	(1%)	0	(0%)	2	(1%)	$1	(2%)

Table 7-4. Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Factor Contributing to Ignition (Continued)

C. Fires That Were Not Intentional

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Other known factor*	60	(5%)	1	(5%)	8	(4%)	$2	(4%)
Total	1,150	(100%)	27	(100%)	227	(100%)	$65	(100%)
Total factors	1,280	(111%)	32	(119%)	260	(114%)	$72	(112%)
All electrical failures or malfunctions	40	(4%)	1	(5%)	9	(4%)	$4	(7%)

* Leading factor for deaths not shown above is high water (5%).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Factor Contributing to Ignition reported as one, unknown, or blank.

Source: NFIRS and NFPA survey.

Table 7-5. Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Area of Origin

A. All Gasoline Fires

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Garage*	490	(20%)	12	(12%)	124	(38%)	$44	(35%)
Living room, family room, or den	170	(7%)	16	(16%)	30	(9%)	$9	(7%)
Exterior wall surface	160	(7%)	0	(0%)	3	(1%)	$1	(1%)
Unclassified outside area	120	(5%)	0	(0%)	7	(2%)	$1	(1%)
Bedroom	120	(5%)	16	(16%)	25	(8%)	$7	(6%)
Multiple areas of origin	120	(5%)	5	(4%)	7	(2%)	$15	(12%)
Kitchen	110	(5%)	2	(2%)	9	(3%)	$4	(3%)
Exterior balcony or unenclosed porch	90	(4%)	1	(1%)	4	(1%)	$2	(2%)
Courtyard, terrace or patio	80	(3%)	0	(0%)	2	(1%)	$1	(1%)
Unclassified function area	70	(3%)	10	(10%)	10	(3%)	$5	(4%)
Crawl space or substructure space	70	(3%)	4	(4%)	12	(4%)	$4	(3%)
Lobby or entrance way	70	(3%)	3	(3%)	7	(2%)	$2	(2%)
Unclassified means of egress	60	(2%)	1	(1%)	2	(1%)	$1	(1%)
Laundry room or area	60	(2%)	4	(4%)	8	(3%)	$1	(1%)
Unclassified structural area	50	(2%)	4	(4%)	7	(2%)	$2	(2%)
Engine or wheel area of vehicle	50	(2%)	0	(0%)	4	(1%)	$3	(2%)
Heating equipment room	50	(2%)	4	(4%)	9	(3%)	$3	(2%)
Unclassified storage area	50	(2%)	1	(1%)	3	(1%)	$1	(1%)
Interior stairway	40	(2%)	4	(4%)	11	(3%)	$2	(2%)
Unclassified area of origin	40	(2%)	1	(1%)	4	(1%)	$1	(1%)
Exterior stairway or fire escape	30	(1%)	0	(0%)	3	(1%)	$1	(1%)
Storage of supplies or tools	30	(1%)	2	(2%)	3	(1%)	$1	(1%)
Storage room, area, tank, or bin	30	(1%)	0	(0%)	3	(1%)	$1	(1%)
Unclassified vehicle area	20	(1%)	0	(0%)	3	(1%)	$1	(1%)
Lawn, field or open area	20	(1%)	0	(0%)	1	(0%)	$0	(0%)
Hallway or corridor	20	(1%)	5	(5%)	4	(1%)	$3	(3%)
Exterior surface of vehicle	20	(1%)	0	(0%)	2	(1%)	$0	(0%)

Table 7-5. Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Area of Origin (Continued)

A. All Gasoline Fires

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Bathroom	20	(1%)	3	(3%)	5	(1%)	$1	(1%)
Fuel tank or fuel line of vehicle	20	(1%)	1	(1%)	4	(1%)	$1	(1%)
Vacant structural area	20	(1%)	0	(0%)	1	(0%)	$0	(0%)
Closet	20	(1%)	0	(0%)	1	(0%)	$1	(1%)
Dining room	20	(1%)	0	(0%)	1	(0%)	$0	(0%)
Ceiling/floor assembly or concealed space	20	(1%)	1	(1%)	1	(0%)	$1	(1%)
Wall assembly or concealed space	10	(1%)	0	(0%)	1	(0%)	$0	(0%)
Other known area of origin	70	(3%)	1	(1%)	4	(1%)	$3	(2%)
Total	2,410	(100%)	101	(100%)	325	(100%)	$125	(100%)

* Excludes residential garage coded as separate property.

B. Intentional Fires

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Exterior wall surface	130	(10%)	0	(0%)	2	(2%)	$1	(2%)
Multiple areas of origin	120	(9%)	4	(5%)	6	(6%)	$16	(27%)
Living room, family room, or den	110	(9%)	16	(21%)	10	(10%)	$5	(9%)
Bedroom	100	(8%)	14	(19%)	16	(16%)	$7	(11%)
Unclassified outside area	80	(6%)	0	(0%)	6	(6%)	$0	(0%)
Garage*	70	(6%)	8	(10%)	14	(14%)	$4	(7%)
Exterior balcony or unenclosed porch	60	(5%)	0	(0%)	4	(4%)	$1	(2%)
Lobby or entrance way	50	(4%)	4	(5%)	5	(5%)	$2	(4%)
Kitchen	50	(4%)	1	(2%)	3	(3%)	$3	(4%)
Unclassified means of egress	50	(4%)	0	(0%)	1	(1%)	$1	(2%)
Courtyard, terrace or patio	50	(4%)	0	(0%)	0	(0%)	$1	(2%)
Unclassified function area	50	(4%)	8	(11%)	4	(4%)	$4	(7%)
Interior stairway	40	(3%)	5	(6%)	10	(10%)	$2	(3%)
Unclassified area of origin	30	(2%)	0	(0%)	1	(1%)	$1	(1%)

Table 7-5. Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Area of Origin (Continued)

B. Intentional Fires

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Exterior stairway, ramp, or fire escape	20	(2%)	0	(0%)	2	(2%)	$0	(1%)
Crawl space or substructure space	20	(2%)	2	(3%)	2	(2%)	$2	(3%)
Unclassified structural area	20	(2%)	1	(1%)	3	(3%)	$1	(1%)
Hallway or corridor	20	(2%)	5	(7%)	3	(3%)	$4	(6%)
Vacant structural area	20	(1%)	0	(0%)	0	(0%)	$0	(1%)
Lawn, field or open area	10	(1%)	0	(0%)	1	(1%)	$0	(0%)
Ceiling/floor assembly or concealed space	10	(1%)	1	(2%)	1	(1%)	$1	(1%)
Exterior surface of vehicle	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Closet	10	(1%)	0	(0%)	1	(1%)	$0	(1%)
Bathroom	10	(1%)	1	(1%)	1	(1%)	$1	(2%)
Dining room	10	(1%)	0	(0%)	1	(1%)	$0	(1%)
Exterior roof surface	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Storage of supplies or tools	10	(1%)	2	(3%)	0	(0%)	$0	(0%)
Laundry room or area	10	(1%)	1	(1%)	1	(1%)	$0	(1%)
Unclassified storage area	10	(1%)	0	(0%)	1	(1%)	$0	(0%)
Wall assembly or concealed space	10	(1%)	0	(0%)	1	(1%)	$0	(0%)
Attic or ceiling/roof assembly or concealed space	10	(1%)	0	(0%)	1	(1%)	$0	(1%)
Other known area of origin	30	(2%)	1	(1%)	1	(1%)	$1	(2%)
Total	1,260	(100%)	74	(100%)	98	(100%)	$60	(100%)

* Excludes residential garage coded as separate property.

Table 7-5. Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Area of Origin

C. Fires That Were Not Intentional

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Garage*	430	(37%)	6	(22%)	110	(49%)	$37	(57%)
Kitchen	60	(5%)	1	(4%)	6	(3%)	$1	(1%)
Living room, family room, or den	50	(5%)	2	(9%)	19	(8%)	$4	(6%)
Laundry room or area	50	(4%)	3	(12%)	8	(4%)	$1	(2%)
Crawl space or substructure space	50	(4%)	2	(9%)	10	(4%)	$2	(3%)
Engine area, running gear or wheel area of vehicle	50	(4%)	0	(0%)	4	(2%)	$3	(5%)
Heating equipment room	50	(4%)	3	(12%)	9	(4%)	$2	(4%)
Unclassified outside area	40	(4%)	0	(0%)	1	(1%)	$1	(1%)
Unclassified storage area	30	(3%)	0	(0%)	3	(1%)	$1	(2%)
Unclassified structural area	30	(3%)	3	(12%)	5	(2%)	$2	(2%)
Exterior wall surface	30	(2%)	0	(0%)	0	(0%)	$0	(1%)
Storage room or area	20	(2%)	0	(0%)	3	(1%)	$1	(1%)
Courtyard, terrace or patio	20	(2%)	0	(0%)	2	(1%)	$0	(1%)
Storage of supplies or tools	20	(2%)	0	(0%)	3	(1%)	$1	(1%)
Unclassified function area	20	(2%)	1	(4%)	6	(3%)	$1	(2%)
Exterior balcony or unenclosed porch	20	(2%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified vehicle area	20	(2%)	0	(0%)	3	(1%)	$1	(2%)
Fuel tank or fuel line of vehicle	20	(2%)	1	(4%)	3	(1%)	$1	(2%)
Bedroom	10	(1%)	1	(4%)	11	(5%)	$1	(1%)
Lobby or entrance way	10	(1%)	0	(0%)	3	(1%)	$0	(0%)
Unclassified area of origin	10	(1%)	1	(4%)	3	(1%)	$0	(0%)
Maintenance or paint shop or area	10	(1%)	0	(0%)	1	(0%)	$1	(1%)
Lawn, field or open area	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Exterior stairway, ramp, or fire escape	10	(1%)	0	(0%)	1	(1%)	$1	(1%)
Exterior surface of vehicle	10	(1%)	0	(0%)	2	(1%)	$0	(0%)
Closet	10	(1%)	0	(0%)	1	(0%)	$1	(1%)
Bathroom	10	(1%)	0	(0%)	3	(1%)	$0	(0%)

Table 7-5. Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Area of Origin (Continued)

C. Fires That Were Not Intentional

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Other known area of origin	40	(3%)	1	(4%)	7	(3%)	$2	(3%)
Total	1,150	(100%)	27	(100%)	227	(100%)	$65	(100%)

* Excludes residential garage coded as separate property.

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Heat Source reported as unknown or blank. Estimates for smoking material, metal, lighter, candle, and other open flame sources include proportional shares of fires reported with Heat Source as "other" heat from open flame or smoking materials.

Source: NFIRS and NFPA survey. Inflation adjustments based on consumer price index.

Table 7-6. Non-Home Structure Fires Starting with Ignition of Gasoline, 2007-2011 Annual Averages, by Major Property Use Group

Property Use Group	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Storage	730	(41%)	7	(35%)	71	(45%)	$25	(24%)
Stores and offices	420	(24%)	6	(30%)	53	(34%)	$57	(56%)
Outside or special property	280	(16%)	0	(0%)	14	(9%)	$2	(2%)
Public assembly	110	(6%)	1	(6%)	1	(1%)	$8	(8%)
Residential	90	(5%)	3	(13%)	4	(3%)	$4	(4%)
Unclassified	30	(2%)	0	(0%)	3	(2%)	$2	(2%)
Industrial, utility, defense, agriculture, or mining	30	(2%)	0	(0%)	5	(3%)	$1	(1%)
Manufacturing	20	(1%)	0	(0%)	3	(2%)	$1	(1%)
Educational	20	(1%)	0	(0%)	0	(0%)	$0	(0%)
Health care or correction	10	(0%)	0	(0%)	2	(1%)	$0	(0%)
None or undetermined	20	(1%)	3	(16%)	2	(1%)	$1	(1%)
Total	1,790	(100%)	21	(100%)	157	(100%)	$102	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars.

Source: NFIRS and NFPA survey.

Table 7-7. Non-Home Structure Fires Starting With Ignition of Gasoline, by Year

Year	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions) as Reported	in 2011 Dollars
1980	11,630	72	565	$103	$280
1981	11,510	19	633	$155	$382
1982	10,900	27	533	$135	$314
1983	9,570	70	714	$123	$278
1984	8,890	36	547	$78	$169
1985	9,470	31	440	$131	$274
1986	8,830	60	627	$113	$232
1987	7,510	30	450	$98	$194
1988	6,600	33	458	$117	$222
1989	5,890	21	328	$89	$162
1990	5,400	37	348	$107	$184
1991	5,480	18	303	$118	$195
1992	6,070	21	250	$179	$287
1993	5,020	18	362	$102	$159
1994	5,100	26	280	$115	$175
1995	4,460	28	212	$110	$162
1996	4,380	34	227	$98	$140
1997	3,610	16	215	$77	$107
1998	3,470	35	216	$75	$103
1999	3,730	42	259	$83	$112
2000	3,630	21	369	$146	$190
2001	2,590	0	204	$101	$128
2002	2,610	12	171	$104	$130
2003	2,490	18	157	$109	$133
2004	2,360	20	169	$112	$133
2005	2,280	13	147	$95	$109
2006	1,730	30	127	$51	$56
2007	2,050	11	147	$115	$125
2008	1,700	38	157	$103	$108
2009	1,820	17	188	$118	$124
2010	1,800	13	178	$94	$97
2011	1,560	30	119	$84	$84

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Also, because participation in NFIRS Version 5.0 was low in the early years (1999-2001), those estimates are especially volatile. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars.

Source: NFIRS and NFPA survey. Inflation adjustments based on consumer price index.

Table 7-8. Non-Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Heat Source

A. All Gasoline Fires

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Spark, ember or flame from operating equipment	390	(22%)	4	(18%)	45	(29%)	$25	(24%)
Cigarette lighter	210	(12%)	6	(29%)	20	(13%)	$5	(5%)
Match	180	(10%)	3	(15%)	2	(1%)	$5	(5%)
Unclassified heat from powered equipment	160	(9%)	1	(3%)	17	(11%)	$14	(13%)
Arcing	100	(5%)	2	(9%)	12	(8%)	$10	(10%)
Unclassified heat source	90	(5%)	3	(14%)	8	(5%)	$8	(8%)
Radiated or conducted heat from operating equipment	90	(5%)	1	(5%)	8	(5%)	$6	(6%)
Flame or torch used for lighting	80	(4%)	0	(0%)	1	(1%)	$1	(1%)
Incendiary device	70	(4%)	0	(0%)	1	(0%)	$3	(3%)
Backfire from internal combustion engine	70	(4%)	0	(0%)	5	(3%)	$3	(3%)
Heat or spark from friction	60	(3%)	1	(7%)	9	(6%)	$8	(8%)
Unclassified hot or smoldering object	60	(3%)	0	(0%)	9	(6%)	$3	(3%)
Smoking material	40	(2%)	0	(0%)	2	(1%)	$1	(1%)
Heat from direct flame or convection currents	30	(2%)	0	(0%)	3	(2%)	$1	(1%)
Hot ember or ash	20	(1%)	0	(0%)	2	(1%)	$0	(0%)
Multiple heat sources including multiple ignitions	20	(1%)	0	(0%)	1	(0%)	$1	(1%)
Unclassified static discharge	20	(1%)	0	(0%)	5	(3%)	$4	(3%)
Conducted heat from another fire	20	(1%)	0	(0%)	0	(0%)	$1	(1%)
Flying brand or ember or spark	20	(1%)	0	(0%)	2	(1%)	$2	(1%)
Molten or hot material	10	(1%)	0	(0%)	3	(2%)	$1	(1%)
Unclassified chemical or natural heat source	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified heat spread from another fire	10	(1%)	0	(0%)	1	(0%)	$0	(0%)
Other known heat source	30	(1%)	0	(0%)	2	(1%)	$2	(2%)

Table 7-8. Non-Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Heat Source (Continued)

A. All Gasoline Fires

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Total	1,790	(100%)	21	(100%)	157	(100%)	$102	(100%)

B. Intentional Fires

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Cigarette lighter	180	(31%)	7	(53%)	11	(52%)	$5	(17%)
Match	170	(29%)	3	(26%)	2	(10%)	$4	(13%)
Incendiary device	80	(15%)	0	(0%)	1	(3%)	$4	(12%)
Flame or torch used for lighting	40	(7%)	0	(0%)	1	(4%)	$1	(4%)
Unclassified heat source	30	(4%)	0	(0%)	0	(0%)	$4	(14%)
Unclassified hot or smoldering object	20	(3%)	0	(0%)	3	(12%)	$0	(0%)
Multiple heat sources	10	(2%)	0	(0%)	1	(3%)	$1	(3%)
Hot ember or ash	10	(2%)	0	(0%)	0	(0%)	$0	(0%)
Spark, ember or flame from operating equipment	10	(1%)	1	(8%)	1	(3%)	$2	(7%)
Smoking materials	10	(1%)	0	(0%)	0	(0%)	$0	(1%)
Heat from direct flame or convection currents	10	(1%)	0	(0%)	0	(0%)	$1	(2%)
Other known heat source*	20	(3%)	2	(13%)	3	(14%)	$8	(27%)
Total	580	(100%)	13	(100%)	21	(100%)	$31	(100%)

Table 7-8. Non-Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Heat Source (Continued)

C. Fires That Were Not Intentional

Property Use Group	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Spark, ember or flame from operating equipment	380	(32%)	3	(33%)	46	(34%)	$22	(30%)
Unclassified heat from powered equipment	150	(13%)	1	(8%)	17	(12%)	$10	(15%)
Arcing	90	(8%)	2	(23%)	13	(9%)	$10	(14%)
Radiated or conducted heat from operating equipment	80	(7%)	1	(11%)	7	(5%)	$6	(8%)
Backfire from internal combustion engine	70	(6%)	0	(0%)	6	(5%)	$3	(5%)
Heat or spark from friction	60	(5%)	0	(0%)	7	(5%)	$3	(5%)
Unclassified heat source	50	(4%)	2	(24%)	8	(6%)	$4	(6%)
Cigarette lighter	40	(4%)	0	(0%)	9	(6%)	$0	(1%)
Unclassified hot or smoldering object	40	(3%)	0	(0%)	6	(4%)	$2	(3%)
Flame or torch used for lighting	40	(3%)	0	(0%)	0	(0%)	$0	(0%)
Heat from direct flame or convection currents	30	(2%)	0	(0%)	3	(2%)	$1	(1%)
Match	30	(2%)	0	(0%)	0	(0%)	$0	(1%)
Smoking materials	20	(2%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified static discharge	20	(1%)	0	(0%)	5	(4%)	$4	(5%)
Conducted heat from another fire	20	(1%)	0	(0%)	0	(0%)	$1	(1%)
Flying brand, ember or spark	20	(1%)	0	(0%)	2	(1%)	$2	(2%)
Hot ember or ash	10	(1%)	0	(0%)	2	(1%)	$0	(0%)
Molten or hot material	10	(1%)	0	(0%)	3	(2%)	$1	(2%)
Unclassified chemical or natural heat source	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified heat spread from another fire	10	(1%)	0	(0%)	1	(0%)	$0	(0%)
Candle	10	(1%)	0	(0%)	2	(1%)	$0	(0%)
Other known heat source	20	(1%)	0	(0%)	0	(0%)	$0	(0%)
Total	1,210	(100%)	9	(100%)	136	(100%)	$71	(100%)

Table 7-8. Non-Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Heat Source (Continued)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Heat Source reported as unknown or blank. Estimates for smoking material, match, lighter, candle, and other open flame sources include proportional shares of fires reported with Heat Source as "other" heat from open flame or smoking materials.

Source: NFIRS and NFPA survey.

Table 7-9. Non-Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Equipment Involved in Ignition

A. All Gasoline Fires

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
No equipment involved	850	(48%)	10	(50%)	48	(31%)	$34	(33%)
Yard equipment including snow blower *	180	(10%)	0	(0%)	2	(1%)	$6	(6%)
Generator, battery or other power source	110	(6%)	0	(0%)	7	(4%)	$3	(3%)
Lamp, light fixture or light bulb **	100	(6%)	3	(12%)	39	(25%)	$28	(28%)
Portable or stationary space heater	100	(5%)	2	(11%)	14	(9%)	$5	(5%)
Grill	70	(4%)	0	(0%)	2	(1%)	$0	(0%)
Torch, burner or soldering equipment	70	(4%)	0	(0%)	15	(10%)	$7	(7%)
Water heater	50	(3%)	1	(3%)	3	(2%)	$3	(3%)
Unclassified equipment involved in ignition	50	(3%)	0	(0%)	0	(0%)	$3	(3%)
Internal combustion engine (non-vehicular)	20	(1%)	0	(0%)	0	(0%)	$2	(2%)
Power drill or screwdriver	20	(1%)	0	(0%)	2	(1%)	$4	(4%)
Pump	20	(1%)	0	(0%)	4	(2%)	$1	(1%)
Unclassified power tools	20	(1%)	0	(0%)	5	(3%)	$2	(2%)
Cigarette or pipe lighter	10	(1%)	0	(0%)	2	(1%)	$0	(0%)
Power sander, grinder, buffer, or polisher	10	(1%)	0	(0%)	2	(1%)	$0	(0%)
No equipment involved	850	(48%)	10	(50%)	48	(31%)	$34	(33%)
Other known equipment***	90	(5%)	5	(23%)	10	(6%)	$4	(4%)
Total	1,790	(100%)	21	(100%)	157	(100%)	$102	(100%)

* Most fires involving yard equipment specifically involved lawn mower, with snow blower having the next largest share.
** Most fires involving lamp, light fixture or light bulb specifically involved work or trouble lights.
*** Leading equipment for deaths not shown above is charcoal lighter (22% of deaths).

Table 7-9. Non-Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Equipment Involved in Ignition (Continued)

B. Intentional Fires

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
No equipment involved	830	(89%)	11	(70%)	38	(80%)	$48	(97%)
Grill, hibachi, or barbecue	30	(4%)	0	(0%)	1	(1%)	$0	(0%)
Cigarette lighter	20	(2%)	0	(0%)	5	(11%)	$0	(0%)
Unclassified equipment	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Air conditioner	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Lawn mower	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Portable or stationary space heater	10	(1%)	0	(0%)	0	(0%)	$1	(1%)
Other known equipment*	10	(1%)	5	(30%)	4	(8%)	$1	(1%)
Total	930	(100%)	15	(100%)	47	(100%)	$49	(100%)

* Leading equipment involved in deaths not cited above is charcoal lighter (30%).

C. Fires That Were Not Intentional

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
No equipment involved	270	(31%)	0	(0%)	24	(22%)	$9	(17%)
Transformer or power supply	80	(9%)	0	(0%)	6	(5%)	$3	(5%)
Lawn mower	70	(8%)	0	(0%)	0	(0%)	$4	(7%)
Lamp or light fixture	70	(8%)	2	(42%)	29	(27%)	$15	(29%)
Portable or stationary space heater	60	(7%)	0	(0%)	9	(8%)	$4	(7%)
Torch, burner or soldering equipment	40	(5%)	0	(0%)	13	(12%)	$3	(6%)
Water heater	40	(4%)	0	(0%)	2	(2%)	$2	(4%)
Unclassified equipment	30	(3%)	0	(0%)	0	(0%)	$2	(4%)
Unclassified kitchen or cooking equipment	20	(2%)	0	(0%)	1	(1%)	$0	(0%)
Leaf blower	20	(2%)	0	(0%)	1	(1%)	$0	(0%)
Grill, hibachi, or barbecue	20	(2%)	0	(0%)	1	(1%)	$0	(0%)

Table 7-9. Non-Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Equipment Involved in Ignition (Continued)

C. Fires That Were Not Intentional

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Internal combustion engine (non-vehicular)	10	(2%)	0	(0%)	0	(0%)	$1	(2%)
Unclassified shop or industrial equipment	10	(1%)	0	(0%)	0	(0%)	$5	(9%)
Unclassified power drill or screwdriver	10	(1%)	0	(0%)	2	(2%)	$2	(3%)
Pump	10	(1%)	0	(0%)	3	(3%)	$0	(1%)
Unclassified gardening tool or agricultural equipment	10	(1%)	0	(0%)	0	(0%)	$0	(1%)
Unclassified power tool	10	(1%)	0	(0%)	4	(4%)	$1	(2%)
Snow blower	10	(1%)	0	(0%)	1	(1%)	$0	(1%)
Unclassified heating, ventilating or air conditioning equipment	10	(1%)	3	(58%)	4	(3%)	$1	(1%)
Power sander, grinder, buffer, or polisher	10	(1%)	0	(0%)	1	(1%)	$0	(0%)
Other known equipment	50	(6%)	0	(0%)	9	(8%)	$2	(4%)
Total	850	(100%)	6	(100%)	110	(100%)	$53	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Equipment Involved in Ignition reported as unknown or blank. Reports of no equipment involved are treated as unknown equipment unless Heat Source is coded as 40-99, indicating a known non-equipment Heat Source. Also, equipment reported with a code ending in two zeros is treated as a partial unknown and proportionally allocated (e.g., unclassified or unknown type cooking equipment.

Source: NFIRS and NFPA survey.

Table 7-10. Non-Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Factor Contributing to Ignition

A. All Gasoline Fires

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Flammable liquid or gas spilled	330	(19%)	8	(36%)	48	(31%)	$28	(27%)
Heat source too close to combustibles	190	(11%)	1	(6%)	23	(15%)	$7	(7%)
Unclassified misuse of material or product	170	(10%)	3	(12%)	18	(12%)	$13	(12%)
Flammable liquid used to kindle fire	160	(9%)	4	(17%)	7	(4%)	$6	(5%)
Unclassified factor contributed to ignition	160	(9%)	3	(16%)	8	(5%)	$12	(12%)
Unclassified mechanical failure or malfunction	100	(6%)	0	(0%)	5	(3%)	$5	(5%)
Exposure fire	90	(5%)	2	(9%)	1	(0%)	$2	(2%)
Cutting or welding too close to combustible	90	(5%)	0	(0%)	10	(6%)	$5	(5%)
Leak or break	80	(5%)	0	(0%)	5	(3%)	$5	(5%)
Abandoned or discarded material	70	(4%)	0	(0%)	1	(0%)	$0	(0%)
Backfire	70	(4%)	0	(0%)	4	(2%)	$3	(2%)
Improper fueling technique	60	(4%)	0	(0%)	10	(6%)	$2	(2%)
Playing with heat source	60	(3%)	0	(0%)	3	(2%)	$0	(0%)
Arc or spark from operating equipment	50	(3%)	0	(0%)	10	(6%)	$3	(3%)
Improper container or storage	50	(3%)	0	(0%)	7	(5%)	$6	(6%)
Collision, knock down, or turn over	40	(2%)	0	(0%)	6	(4%)	$8	(7%)
Unclassified operational deficiency	20	(1%)	0	(0%)	1	(0%)	$1	(1%)
Outside or open fire for debris or waste disposal	20	(1%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified electrical failure or malfunction	20	(1%)	0	(0%)	1	(0%)	$1	(1%)
Equipment not being operated properly	20	(1%)	0	(0%)	4	(3%)	$1	(1%)
Unspecified short circuit arc	10	(1%)	0	(0%)	2	(1%)	$0	(0%)
Improper fuel used	10	(1%)	0	(0%)	4	(3%)	$0	(0%)

Table 7-10. Non-Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Factor Contributing to Ignition (Continued)

A. All Gasoline Fires

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Unclassified fire spread or control	10	(1%)	1	(6%)	0	(0%)	$0	(0%)
Improper startup	10	(1%)	0	(0%)	1	(0%)	$0	(0%)
Equipment used for not intended purpose	10	(1%)	0	(0%)	1	(1%)	$2	(2%)
Other known factor	60	(3%)	0	(0%)	2	(1%)	$4	(4%)
Total	1,790	(100%)	21	(100%)	157	(100%)	$102	(100%)
Total factors	1,960	(110%)	22	(103%)	180	(115%)	$115	(113%)
All electrical failures or malfunctions	90	(5%)	0	(0%)	13	(8%)	$6	(6%)

B. Intentional Fires

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Flammable liquid used to kindle fire	260	(28%)	4	(27%)	11	(23%)	$9	(18%)
Unclassified misuse of material or product	220	(23%)	3	(20%)	16	(35%)	$17	(35%)
Unclassified factor contributed to ignition	210	(22%)	2	(15%)	6	(12%)	$16	(32%)
Flammable liquid or gas spilled	100	(11%)	4	(25%)	7	(15%)	$3	(7%)
Playing with heat source	80	(9%)	0	(0%)	8	(17%)	$1	(1%)
Abandoned or discarded material	50	(5%)	0	(0%)	0	(0%)	$1	(1%)
Outside or open fire for debris or waste disposal	20	(3%)	0	(0%)	0	(0%)	$0	(0%)
Heat source too close to combustibles	20	(2%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified fire spread or control	10	(1%)	2	(12%)	0	(0%)	$0	(0%)
Improper fuel used	10	(1%)	0	(0%)	2	(5%)	$0	(0%)
Other known factor	20	(2%)	0	(0%)	0	(0%)	$7	(14%)

Table 7-10. Non-Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Factor Contributing to Ignition (Continued)

B. Intentional Fires

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Total	930	(100%)	15	(100%)	47	(100%)	$49	(100%)
Total factors	1,010	(108%)	15	(100%)	50	(107%)	$53	(109%)
All electrical failures or malfunctions	0	(0%)	0	(0%)	0	(0%)	$0	(0%)

C. Fires That Were Not Intentional

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Flammable liquid or gas spilled	170	(21%)	2	(37%)	35	(32%)	$18	(33%)
Heat source too close to combustibles	110	(13%)	1	(16%)	19	(17%)	$5	(9%)
Unclassified mechanical failure or malfunction	60	(7%)	0	(0%)	4	(4%)	$4	(7%)
Cutting or welding too close to combustible	60	(7%)	0	(0%)	8	(7%)	$3	(6%)
Exposure fire	60	(7%)	1	(23%)	0	(0%)	$1	(2%)
Leak or break	50	(6%)	0	(0%)	4	(4%)	$4	(7%)
Unclassified misuse of material or product	50	(5%)	0	(8%)	10	(9%)	$2	(4%)
Improper fueling technique	40	(5%)	0	(0%)	7	(6%)	$1	(3%)
Backfire	40	(5%)	0	(0%)	3	(3%)	$2	(4%)
Abandoned or discarded material	40	(5%)	0	(0%)	0	(0%)	$0	(0%)
Improper container or storage	30	(4%)	0	(0%)	6	(5%)	$5	(9%)
Unclassified factor contributed to ignition	30	(4%)	1	(24%)	4	(4%)	$3	(6%)
Arc or spark from operating equipment	30	(4%)	0	(0%)	8	(7%)	$2	(4%)
Flammable liquid used to kindle fire	20	(3%)	0	(0%)	3	(3%)	$0	(0%)
Collision, knock down, or turn over	20	(2%)	0	(0%)	5	(5%)	$4	(8%)
Unclassified operational deficiency	20	(2%)	0	(0%)	1	(1%)	$1	(2%)
Equipment not being operated properly	10	(1%)	0	(0%)	4	(3%)	$1	(1%)
Unclassified electrical failure or malfunction	10	(1%)	0	(0%)	1	(1%)	$1	(1%)

Table 7-10. Non-Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Factor Contributing to Ignition (Continued)

C. Fires That Were Not Intentional

Factor	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Playing with heat source	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Unspecified short circuit arc	10	(1%)	0	(0%)	2	(1%)	$0	(0%)
Improper startup	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Washing part or painting with flammable liquid	10	(1%)	0	(0%)	1	(1%)	$0	(1%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Factor Contributing to Ignition reported as none, unknown or blank.

Source: NFIRS and NFPA survey.

Table 7-11. Non-Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Area of Origin

A. All Gasoline Fires

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Garage*	400	(22%)	3	(15%)	55	(35%)	$19	(19%)
Maintenance or paint shop or area	160	(9%)	3	(12%)	32	(21%)	$24	(24%)
Engine area, running gear or wheel area of vehicle	130	(7%)	1	(5%)	9	(6%)	$5	(5%)
Unclassified outside area	90	(5%)	0	(0%)	2	(1%)	$1	(1%)
Unclassified storage area	90	(5%)	2	(10%)	5	(3%)	$3	(3%)
Fuel tank or fuel line of vehicle	90	(5%)	0	(0%)	9	(6%)	$7	(7%)
Storage of supplies or tools	70	(4%)	1	(6%)	4	(2%)	$2	(2%)
Exterior wall surface	60	(3%)	0	(0%)	1	(0%)	$2	(2%)
Unclassified equipment or service area	50	(3%)	0	(0%)	3	(2%)	$4	(3%)
Lawn, field or open area	50	(3%)	0	(0%)	0	(0%)	$0	(0%)
Lobby or entrance way	40	(2%)	1	(4%)	1	(1%)	$2	(2%)
Unclassified area of origin	40	(2%)	0	(0%)	3	(2%)	$0	(0%)
Storage room, area, tank, or bin	30	(2%)	0	(2%)	4	(3%)	$1	(1%)
On or near highway, public way or street	30	(2%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified structural area	30	(2%)	0	(0%)	3	(2%)	$2	(2%)
Unclassified vehicle area	30	(2%)	2	(9%)	1	(1%)	$1	(1%)
Unclassified means of egress	30	(2%)	0	(0%)	1	(1%)	$1	(1%)
Exterior roof surface	20	(1%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified function area	20	(1%)	1	(3%)	3	(2%)	$2	(1%)
Office	20	(1%)	0	(0%)	1	(0%)	$3	(2%)
Multiple areas of origin	20	(1%)	0	(0%)	1	(1%)	$2	(2%)
Courtyard, terrace or patio	20	(1%)	0	(0%)	3	(2%)	$0	(0%)
Kitchen	20	(1%)	0	(0%)	2	(1%)	$1	(1%)
Unclassified service facility	20	(1%)	0	(0%)	2	(1%)	$1	(1%)

Table 7-11. Non-Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Area of Origin (Continued)

A. All Gasoline Filters

Area	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Wildland area or woods	20	(1%)	0	(0%)	0	(0%)	$0	(0%)
Wall assembly or concealed space	10	(1%)	1	(3%)	0	(0%)	$0	(0%)
Exterior balcony or unenclosed porch	10	(1%)	0	(0%)	0	(0%)	$1	(1%)
Heating equipment room	10	(1%)	0	(0%)	1	(0%)	$1	(1%)
Exterior surface of vehicle	10	(1%)	0	(0%)	1	(1%)	$0	(0%)
Cargo or trunk area of vehicle	10	(1%)	0	(0%)	1	(1%)	$0	(0%)
Living room, family room, lounge or den	10	(1%)	1	(3%)	0	(0%)	$1	(1%)
Bathroom, locker room or check room	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Shipping, receiving or loading area	10	(1%)	0	(0%)	2	(1%)	$0	(0%)
Exterior stairway, ramp, or fire escape	10	(1%)	1	(4%)	1	(1%)	$1	(1%)
Other known area of origin	130	(7%)	5	(22%)	9	(6%)	$13	(13%)
Total	1,790	(100%)	21	(100%)	157	(100%)	$102	(100%)

* May not include or be limited to garages coded as property use.

B. Intentional Fires

Area	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Unclassified outside area	60	(10%)	0	(0%)	2	(7%)	$0	(0%)
Garage*	60	(10%)	1	(5%)	3	(16%)	$2	(7%)
Exterior wall surface	50	(8%)	0	(0%)	0	(0%)	$0	(1%)
Lawn, field or open area	40	(7%)	0	(0%)	0	(0%)	$0	(0%)
On or near highway, public way or street	30	(5%)	0	(0%)	0	(0%)	$0	(0%)
Lobby or entrance way	30	(4%)	1	(9%)	0	(0%)	$2	(5%)

Table 7-11. Non-Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Area of Origin (Continued)

B. Intentional Fires

Area	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Office	20	(4%)	0	(0%)	1	(3%)	$3	(9%)
Unclassified storage area	20	(4%)	3	(22%)	2	(11%)	$2	(7%)
Unclassified means of egress	20	(3%)	0	(0%)	0	(0%)	$1	(3%)
Exterior roof surface	20	(3%)	0	(0%)	0	(0%)	$0	(1%)
Multiple areas of origin	20	(3%)	0	(0%)	1	(5%)	$2	(6%)
Storage room, area, tank, or bin	20	(3%)	1	(5%)	2	(11%)	$1	(2%)
Unclassified area of origin	20	(3%)	0	(0%)	3	(12%)	$0	(0%)
Storage of supplies or tools	10	(2%)	2	(14%)	1	(2%)	$1	(3%)
Wildland area or woods	10	(2%)	0	(0%)	0	(0%)	$0	(0%)
Kitchen	10	(2%)	0	(0%)	1	(2%)	$1	(3%)
Bathroom, locker room or check room	10	(2%)	0	(0%)	0	(0%)	$0	(0%)
Common room, living room, family room, lounge or den	10	(2%)	1	(8%)	0	(0%)	$1	(2%)
Unclassified structural area	10	(2%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified function area	10	(2%)	0	(0%)	1	(4%)	$1	(3%)
Exterior stairway, ramp, or fire escape	10	(1%)	1	(9%)	1	(5%)	$1	(4%)
Exterior surface of vehicle	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Sales or showroom area	10	(1%)	1	(5%)	1	(3%)	$1	(5%)
Small assembly area for fewer than 100 persons	10	(1%)	0	(0%)	0	(0%)	$1	(3%)
Shipping, receiving, or loading area	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Wall assembly or concealed space	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Exterior balcony or unenclosed porch	10	(1%)	0	(0%)	0	(0%)	$1	(2%)
Hallway, corridor, or mall	10	(1%)	0	(0%)	1	(2%)	$0	(0%)

Table 7-11. Non-Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Area of Origin (Continued)

B. Intentional Fires

Area	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Vacant structural area	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Courtyard, terrace or patio	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Other known area of origin**	50	(9%)	3	(22%)	3	(16%)	$10	(31%)
Total	580	(100%)	13	(100%)	21	(100%)	$31	(100%)

* May not include all or only garages coded as property use.

** Leading area of origin for deaths not shown above are ceiling/floor assembly or concealed space (12%) and bedroom (11%).

C. Fires That Were Not Intentional

Area	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Garage*	330	(28%)	2	(24%)	51	(38%)	$17	(24%)
Maintenance or paint shop or area	150	(13%)	0	(0%)	34	(25%)	$25	(35%)
Engine area, running gear or wheel area of vehicle	130	(11%)	1	(17%)	9	(6%)	$5	(7%)
Fuel tank or fuel line of vehicle	80	(7%)	0	(0%)	9	(6%)	$5	(7%)
Unclassified storage area	70	(6%)	0	(0%)	2	(1%)	$1	(1%)
Unclassified equipment or service area	50	(5%)	0	(0%)	3	(2%)	$3	(4%)
Storage of supplies or tools	50	(4%)	0	(0%)	4	(3%)	$1	(1%)
Unclassified outside area	40	(3%)	0	(0%)	1	(0%)	$1	(2%)
Unclassified vehicle area	30	(2%)	3	(31%)	1	(1%)	$1	(1%)
Unclassified area of origin	20	(2%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified structural area	20	(2%)	0	(0%)	2	(2%)	$2	(3%)

Table 7-11. Non-Home Structure Fires Starting With Ignition of Gasoline, 2007-2011 Annual Averages, by Area of Origin (Continued)

C. Fires That Were Not Intentional

Area	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Unclassified service facility	20	(1%)	0	(0%)	2	(1%)	$2	(2%)
Storage room, area, tank, or bin	20	(1%)	0	(0%)	2	(2%)	$0	(0%)
Courtyard, terrace or patio	20	(1%)	0	(0%)	3	(2%)	$0	(0%)
Heating equipment room	10	(1%)	0	(0%)	1	(0%)	$2	(2%)
Lawn, field or open area	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Exterior wall surface	10	(1%)	0	(0%)	1	(0%)	$2	(2%)
Cargo or trunk area of vehicle	10	(1%)	0	(0%)	1	(0%)	$0	(0%)
Unclassified function area	10	(1%)	0	(0%)	1	(1%)	$1	(1%)
Kitchen	10	(1%)	0	(0%)	1	(1%)	$0	(0%)
Laboratory	10	(1%)	0	(0%)	1	(0%)	$0	(0%)
Unclassified means of egress	10	(1%)	0	(0%)	1	(1%)	$0	(0%)
Laundry or mail chute	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Wall assembly or concealed space	10	(1%)	1	(11%)	0	(0%)	$0	(0%)
Processing or manufacturing area or workroom	10	(1%)	0	(0%)	2	(1%)	$1	(1%)
Trash chute, area or container	10	(1%)	0	(0%)	0	(0%)	$0	(0%)
Other known area of origin**	0	(0%)	0	(0%)	6	(5%)	$2	(3%)
Total	1,210	(100%)	9	(100%)	136	(100%)	$71	(100%)

* May not include or be limited to garages coded as property use.

** Leading area for deaths not shown above is passenger area of vehicle (18% of deaths).

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fires with type of material first ignited unknown or blank. From 1999 on, separate analysis is conducted on fires reported as confined fires (confined to cooking vessel, chimney or flue, fuel burner or boiler, trash, incinerator, or compactor) or reported as item first ignited 70-99, because reporting of type of material first ignited is not required in either circumstance. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian death and injuries to the nearest one, and direct property damage to the nearest million dollars. Estimates include proportional shares of fires with Area of Origin reported as unknown or blank.

Source: NFIRS and NFPA survey.

Appendix A.
How National Estimates Statistics Are Calculated

The statistics in this analysis are estimates derived from the U.S. Fire Administration's (USFA's) National Fire Incident Reporting System (NFIRS) and the National Fire Protection Association's (NFPA's) annual survey of U.S. fire departments. NFIRS is a voluntary system by which participating fire departments report detailed factors about the fires to which they respond. Roughly two-thirds of U.S. fire departments participate, although not all of these departments provide data every year. Fires reported to federal or state fire departments or industrial fire brigades are not included in these estimates.

NFIRS provides the most detailed incident information of any national database not limited to large fires. NFIRS is the only database capable of addressing national patterns for fires of all sizes by specific property use and specific fire cause. NFIRS also captures information on the extent of flame spread, and automatic detection and suppression equipment. For more information about NFIRS visit http://www.nfirs.fema.gov/. Copies of the paper forms may be downloaded from http://www.nfirs.fema.gov/documentation/design/NFIRS_Paper_Forms_2008.pdf.

NFIRS has a wide variety of data elements and code choices. The NFIRS database contains coded information. Many code choices describe several conditions. These cannot be broken down further. For example, area of origin code 83 captures fires starting in vehicle engine areas, running gear areas or wheel areas. It is impossible to tell the portion of each from the coded data.

Methodology may change slightly from year to year.
NFPA is continually examining its methodology to provide the best possible answers to specific questions, methodological and definitional changes can occur. *Earlier editions of the same report may have used different methodologies to produce the same analysis, meaning that the estimates are not directly comparable from year to year.*

NFPA's fire department experience survey provides estimates of the big picture.
Each year, NFPA conducts an annual survey of fire departments which enables us to capture a summary of fire department experience on a larger scale. Surveys are sent to all municipal departments protecting populations of 50,000 or more and a random sample, stratified by community size, of the smaller departments. Typically, a total of roughly 3,000 surveys are returned, representing about one of every ten U.S. municipal fire departments and about one third of the U.S. population.

The survey is stratified by size of population protected to reduce the uncertainty of the final estimate. Small rural communities have fewer people protected per department and are less likely to respond to the survey. A larger number must be surveyed to obtain an adequate sample of those departments. (NFPA also makes follow-up calls to a sample of the smaller fire departments that do not respond, to confirm that those that did respond are truly representative of fire departments their size.) On the other hand, large city departments are so few in number and protect such a large proportion of the total U.S.

population that it makes sense to survey all of them. Most respond, resulting in excellent precision for their part of the final estimate.

The survey includes the following information: (1) the total number of fire incidents, civilian deaths, and civilian injuries, and the total estimated property damage (in dollars), for each of the major property use classes defined in NFIRS; (2) the number of on-duty firefighter injuries, by type of duty and nature of illness; 3) the number and nature of non-fire incidents; and (4) information on the type of community protected (e.g., county versus township versus city) and the size of the population protected, which is used in the statistical formula for projecting national totals from sample results. The results of the survey are published in the annual report *Fire Loss in the United States*. To download a free copy of the report, visit http://www.nfpa.org/assets/files/PDF/OS.fireloss.pdf.

Projecting NFIRS to National Estimates

As noted, NFIRS is a voluntary system. Different states and jurisdictions have different reporting requirements and practices. Participation rates in NFIRS are not necessarily uniform across regions and community sizes, both factors correlated with frequency and severity of fires. This means NFIRS may be susceptible to systematic biases. No one at present can quantify the size of these deviations from the ideal, representative sample, so no one can say with confidence that they are or are not serious problems. But there is enough reason for concern so that a second database -- the NFPA survey -- is needed to project NFIRS to national estimates and to project different parts of NFIRS separately. This multiple calibration approach makes use of the annual NFPA survey where its statistical design advantages are strongest.

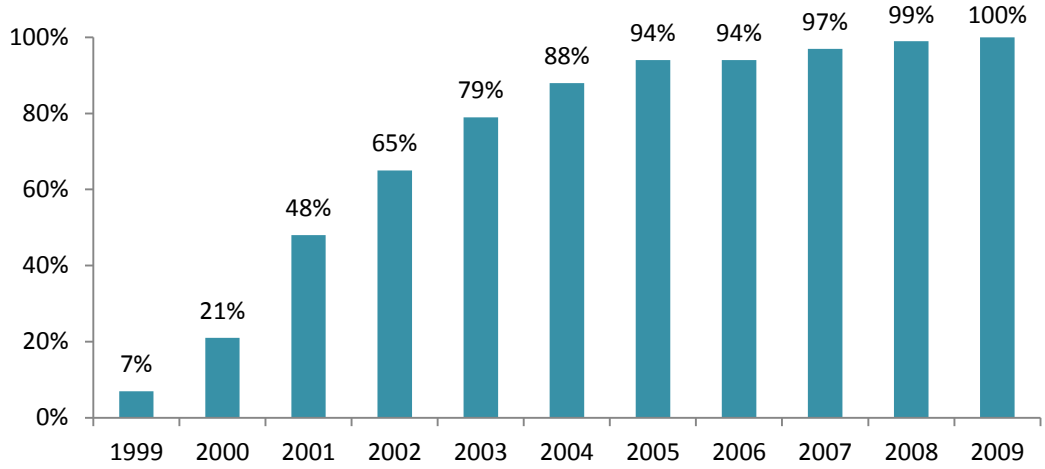
Scaling ratios are obtained by comparing NFPA's projected totals of residential structure fires, non-residential structure fires, vehicle fires, and outside and other fires, and associated civilian deaths, civilian injuries, and direct property damage with comparable totals in NFIRS. Estimates of specific fire problems and circumstances are obtained by multiplying the NFIRS data by the scaling ratios. Reports for incidents in which mutual aid was given are excluded from NFPA's analyses.

Analysts at the NFPA, the USFA and the Consumer Product Safety Commission developed the specific basic analytical rules used for this procedure. "The National Estimates Approach to U.S. Fire Statistics," by John R. Hall, Jr. and Beatrice Harwood, provides a more detailed explanation of national estimates.

Version 5.0 of NFIRS, first introduced in 1999, used a different coding structure for many data elements, added some property use codes, and dropped others. The essentials of the approach described by Hall and Harwood are still used, but some modifications have been necessary to accommodate the changes in NFIRS 5.0.

Figure A.1 shows the percentage of fires originally collected in the NFIRS 5.0 system. Each year's release version of NFIRS data also includes data collected in older versions of NFIRS that were converted to NFIRS 5.0 codes.

Figure A.1. Fires Originally Collected in NFIRS 5.0 by Year



From 1999 data on, analyses are based on scaling ratios using only data originally collected in NFIRS 5.0:

NFPA survey projections
NFIRS totals (Version 5.0)

For 1999 to 2001, the same rules may be applied, but estimates for these years in this form will be less reliable due to the smaller amount of data originally collected in NFIRS 5.0; they should be viewed with extreme caution.

NFIRS 5.0 introduced six categories of confined structure fires, including:

- cooking fires confined to the cooking vessel,
- confined chimney or flue fires,
- confined incinerator fire,
- confined fuel burner or boiler fire or delayed ignition,
- confined commercial compactor fire, and
- trash or rubbish fires in a structure with no flame damage to the structure or its contents.

Although causal and other detailed information is typically not required for these incidents, it is provided in some cases. Some analyses, particularly those that examine cooking equipment, heating equipment, fires caused by smoking materials, and fires started by playing with fire, may examine the confined fires in greater detail. Because the confined fire incident types describe certain scenarios, the distribution of unknown data differs from that of all fires. Consequently, allocation of unknowns must be done separately.

Some analyses of structure fires show only non-confined fires. In these tables, percentages shown are of non-confined structure fires rather than all structure fires. This approach has the advantage of showing the frequency of specific factors in fire causes, but the disadvantage of possibly overstating the percentage of factors that are seldom seen in the confined fire incident types and of understating the factors specifically associated with the confined fire incident types.

Other analyses include entries for confined fire incident types in the causal tables and show percentages based on total structure fires. In these cases, the confined fire incident type is treated as a general causal factor.

For most fields other than Property Use and Incident Type, NFPA allocates unknown data proportionally among known data. This approach assumes that if the missing data were known, it would be distributed in the same manner as the known data. NFPA makes additional adjustments to several fields. *Casualty and loss projections can be heavily influenced by the inclusion or exclusion of unusually serious fire.*

In the formulas that follow, the term "all fires" refers to all fires in NFIRS on the dimension studied. The percentages of fires with known or unknown data are provided for non-confined fires and associated losses, and for confined fires only.

Cause of Ignition: This field is used chiefly to identify intentional fires. "Unintentional" in this field is a specific entry and does not include other fires that were not intentionally set: failure of equipment or heat source, act of nature, or "other" (unclassified)." The last should be used for exposures but has been used for other situations as well. Fires that were coded as under investigation and those that were coded as undetermined after investigation were treated as unknown.

Factor Contributing to Ignition: In this field, the code "none" is treated as an unknown and allocated proportionally. For Human Factor Contributing to Ignition, NFPA enters a code for "not reported" when no factors are recorded. "Not reported" is treated as an unknown, but the code "none" is treated as a known code and not allocated. Multiple entries are allowed in both of these fields. Percentages are calculated on the total number of fires, not entries, resulting in sums greater than 100%. Although Factor Contributing to Ignition is only required when the cause of ignition was coded as: 2) unintentional, 3) failure of equipment or heat source; or 4) act of nature, data is often present when not required. Consequently, any fire in which no factor contributing to ignition was entered was treated as unknown.

In some analyses, all entries in the category of mechanical failure, malfunction (factor contributing to ignition 20-29) are combined and shown as one entry, "mechanical failure or malfunction." This category includes:

21. Automatic control failure;
22. Manual control failure;
23. Leak or break. Includes leaks or breaks from containers or pipes. Excludes operational deficiencies and spill mishaps;
25. Worn out;
26. Backfire. Excludes fires originating as a result of hot catalytic converters;
27. Improper fuel used; Includes the use of gasoline in a kerosene heater and the like; and
20. Mechanical failure or malfunction, other.

Entries in "electrical failure, malfunction" (factor contributing to ignition 30-39) may also be combined into one entry, "electrical failure or malfunction." This category includes:

31. Water-caused short circuit arc;
32. Short-circuit arc from mechanical damage;
33. Short-circuit arc from defective or worn insulation;
34. Unspecified short circuit arc;
35. Arc from faulty contact or broken connector, including broken power lines and loose connections;
36. Arc or spark from operating equipment, switch, or electric fence;
37. Fluorescent light ballast; and
30. Electrical failure or malfunction, other.

Heat Source. In NFIRS 5.0, one grouping of codes encompasses various types of open flames and smoking materials. In the past, these had been two separate groupings. A new code was added to NFIRS 5.0, which is code 60: "Heat from open flame or smoking material, other." NFPA treats this code as a partial unknown and allocates it proportionally across the codes in the 61-69 range, shown below.

61. Cigarette;
62. Pipe or cigar;
63. Heat from undetermined smoking material;
64. Match;
65. Lighter: cigarette lighter, cigar lighter;
66. Candle;
67 Warning or road flare, fuse;
68. Backfire from internal combustion engine. Excludes flames and sparks from an exhaust system, (11); and
69. Flame/torch used for lighting. Includes gas light and gas-/liquid-fueled lantern.

In addition to the conventional allocation of missing and undetermined fires, NFPA multiplies fires with codes in the 61-69 range by

$$\frac{\text{All fires in range 60-69}}{\text{All fires in range 61-69}}$$

The downside of this approach is that heat sources that are truly a different type of open flame or smoking material are erroneously assigned to other categories. The grouping "smoking materials" includes codes 61-63 (cigarettes, pipes or cigars, and heat from undetermined smoking material, with a proportional share of the code 60s and true unknown data.

Equipment Involved in Ignition (EII). NFIRS 5.0 originally defined EII as the piece of equipment that provided the principal heat source to cause ignition if the equipment malfunctioned or was used improperly. In 2006, the definition was modified to "the piece of equipment that provided the principal heat source to cause ignition." However, much of the data predates the change. Individuals who have already been trained with the older definition may

not change their practices. To compensate, NFPA treats fires in which EII = NNN and heat source is not in the range of 40-99 as an additional unknown.

To allocate unknown data for EII, the known data is multiplied by

$$\frac{\text{All fires}}{\text{(All fires – blank – undetermined – [fires in which EII =NNN and heat source <>40-99])}}$$

In addition, the partially unclassified codes for broad equipment groupings (i.e., code 100 - heating, ventilation, and air conditioning, other; code 200 - electrical distribution, lighting and power transfer, other; etc.) were allocated proportionally across the individual code choices in their respective broad groupings (heating, ventilation, and air conditioning; electrical distribution, lighting and power transfer, other; etc.). Equipment that is totally unclassified is not allocated further. This approach has the same downside as the allocation of heat source 60 described above. Equipment that is truly different is erroneously assigned to other categories.

In some analyses, various types of equipment are grouped together.

Code Grouping	**EII Code**	**NFIRS definitions**
Central heat	132	Furnace or central heating unit
	133	Boiler (power, process or heating)
Fixed or portable space heater	131	Furnace, local heating unit, built-in
	123	Fireplace with insert or stove
	124	Heating stove
	141	Heater, excluding catalytic and oil-filled
	142	Catalytic heater
	143	Oil-filled heater
Fireplace or chimney	120	Fireplace or chimney
	121	Fireplace, masonry
	122	Fireplace, factory-built
	125	Chimney connector or vent connector
	126	Chimney – brick, stone or masonry
	127	Chimney-metal, including stovepipe or flue
Fixed wiring and related equipment	210	Unclassified electrical wiring
	211	Electrical power or utility line
	212	Electrical service supply wires from utility
	213	Electric meter or meter box
	214	Wiring from meter box to circuit breaker
	215	Panel board, switch board or circuit breaker board
	216	Electrical branch circuit
	217	Outlet or receptacle
	218	Wall switch
	219	Ground fault interrupter
Transformers and power supplies	221	Distribution-type transformer
	222	Overcurrent, disconnect equipment
	223	Low-voltage transformer
	224	Generator
	225	Inverter

	226	Uninterrupted power supply (UPS)
	227	Surge protector
	228	Battery charger or rectifier
	229	Battery (all types)
Lamp, bulb or lighting	230	Unclassified lamp or lighting
	231	Lamp-tabletop, floor or desk
	232	Lantern or flashlight
	233	Incandescent lighting fixture
	234	Fluorescent light fixture or ballast
	235	Halogen light fixture or lamp
	236	Sodium or mercury vapor light fixture or lamp
	237	Work or trouble light
	238	Light bulb
	241	Nightlight
	242	Decorative lights – line voltage
	243	Decorative or landscape lighting – low voltage
	244	Sign
Cord or plug	260	Unclassified cord or plug
	261	Power cord or plug, detachable from appliance
	262	Power cord or plug- permanently attached
	263	Extension cord
Torch, burner or soldering iron	331	Welding torch
	332	Cutting torch
	333	Burner, including Bunsen burners
	334	Soldering equipment
Portable cooking or warming equipment	631	Coffee maker or teapot
	632	Food warmer or hot plate
	633	Kettle
	634	Popcorn popper
	635	Pressure cooker or canner
	636	Slow cooker
	637	Toaster, toaster oven, counter-top broiler
	638	Waffle iron, griddle
	639	Wok, frying pan, skillet
	641	Breadmaking machine

Equipment was not analyzed separately for confined fires. Instead, each confined fire incident type was listed with the equipment or as other known equipment.

Item First Ignited. In most analyses, mattress and pillows (item first ignited 31) and bedding, blankets, sheets, and comforters (item first ignited 32) are combined and shown as "mattresses and bedding." In many analyses, wearing apparel not on a person (code 34) and wearing apparel on a person (code 35) are combined and shown as "clothing." In some analyses, flammable and combustible liquids and gases, piping and filters (item first ignited 60-69) are combined and shown together.

Area of Origin. Two areas of origin: bedroom for more than five people (code 21) and bedroom for less than five people (code 22) are combined and shown as simply "bedroom." Chimney is no longer a valid area of origin code for non-confined fires.

Rounding and percentages. The data shown are estimates and generally rounded. An entry of zero may be a true zero or it may mean that the value rounds to zero. Percentages are calculated from unrounded values. It is quite possible to have a percentage entry of up to 100% even if the rounded number entry is zero. The same rounded value may account for a slightly different percentage share. Because percentages are expressed in integers and not carried out to several decimal places, percentages that appear identical may be associated with slightly different values.

Additional Information for Report

Reporting of Type of Material First Ignited is not required if Item First Ignited is coded in the range of 70 to 99. As with confined fires, the field is nevertheless reported for many fires, but the percentage of unknowns and blanks is higher. Fires are analyzed separately for (1) non-confined structure fires, (2) confined structure fires, (3) vehicle fires, (4) outdoor or other vegetation fires, and (5) outdoor or other non-vegetation fires (principally trash). In addition, fires are analyzed separately for Item First Ignited 70-99 and Item First Ignited not in 70-99.

Here are the percentages of unknowns and blanks for these 10 categories of fires, for home and non-home fires.

	Item First Ignited 70-99		Item First Ignited Not 70-99	
	Home	Non-Home	Home	Non-Home
Non-confined structure fires	50%	57%	45%	52%
Confined structure fires	51%	48%	94%	94%
Vehicle fires	61%	63%	65%	69%
Outdoor/other vegetation	68%	73%	77%	87%
Outdoor/other non-vegetation	57%	56%	89%	93%