HOME STRUCTURE FIRES BY EQUIPMENT INVOLVED IN IGNITION

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National Fire Protection Association
Fire Analysis and Research Division

Acknowledgements

The National Fire Protection Association thanks all the fire departments and state fire authorities who participate in the National Fire Incident Reporting System (NFIRS) and the annual NFPA fire experience survey. These firefighters are the original sources of the detailed data that make this analysis possible. Their contributions allow us to estimate the size of the fire problem.

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

Keywords: non-home equipment fires, non-residential equipment fires, fire statsitics

For more information about the National Fire Protection Association, visit www.nfpa.org or call 617-770-3000. To learn more about the One-Stop Data Shop go to www.nfpa.org/osds or call 617-984-7443.

Copies of this analysis are available from:

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NFPA No. USS87

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Home Structure Fires (Including Fires Coded as Confined Fires), by Equipment Involved in Ignition (EII)
Annual Average of 2006-2010 Structure Fires Reported to U.S. Fire Departments

EII	Type of Equipment	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)
631-647, 654	**COOKING EQUIPMENT**	**157,262**	**377**	**4,916**	**$794**
	Non-confined	*38,689*	*377*	*3,301*	*$768*
	Confined	*118,573*	*0*	*1,615*	*$25*
646	Range	90,431	329	3,471	$571
	Non-confined	*30,049*	*329*	*2,778*	*$555*
	Confined	*60,382*	*0*	*963*	*$16*
645	Oven	24,904	16	271	$34
	Non-confined	*2,909*	*16*	*139*	*$32*
	Confined	*21,994*	*0*	*133*	*$2*
644	Microwave oven	7,287	4	152	$31
	Non-confined	*1,458*	*4*	*109*	*$29*
	Confined	*5,829*	*0*	*43*	*$3*
631-641	Portable cooking or warming device	6,624	16	208	$60
	Non-confined	*2,010*	*16*	*162*	*$59*
	Confined	*4,613*	*0*	*47*	*$1*
637	Toaster or toaster oven	3,117	0	68	$23
639	Wok, frying pan, or skillet	2,266	2	84	$18
632	Food warmer or hot plate	422	9	23	$5
631	Coffee maker or teapot	347	5	16	$10
633	Kettle	183	0	5	$1
636	Slow cooker	159	0	7	$2
635	Pressure cooker or canner	52	0	3	$0
638	Waffle iron or griddle	42	0	1	$1
641	Breadmaking machine	23	0	0	$0
634	Popcorn popper	14	0	1	$0
643	Grill, hibachi, or barbecue	3,588	12	104	$72
	Non-confined	*1,453*	*12*	*79*	*$72*
	Confined	*2,135*	*0*	*25*	*$0*

Home Structure Fires (Including Fires Coded as Confined Fires), by Equipment Involved in Ignition (EII)
Annual Average of 2006-2010 Structure Fires Reported to U.S. Fire Departments (Continued)

EII	Type of Equipment	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)
	COOKING EQUIPMENT (Continued)				
642	Deep fryer	864	0	33	$15
	Non-confined	*400*	*0*	*28*	*$15*
	Confined	*464*	*0*	*5*	*$0*
654	Grease hood or duct exhaust fan	665	0	8	$6
	Non-confined	*402*	*0*	*6*	*$6*
	Confined	*263*	*0*	*3*	*$0*
647	Steam table or warming drawer	45	0	0	$0
	Non-confined	*7*	*0*	*0*	*$0*
	Confined	*38*	*0*	*0*	*$0*
	Confined to cooking vessel but coded as equipment other than cooking equipment	*13,820*	*0*	*227*	*$2*
	Confined to cooking vessel and coded as no equipment involved in ignition	*9,035*	*0*	*169*	*$1*
611-623, 651-653, 655-656	**KITCHEN EQUIPMENT OTHER THAN COOKING EQUIPMENT[1]**	**2,924**	**6**	**82**	**$75**
652, 655-656	Refrigerator, freezer, or ice maker	1,706	2	56	$50
656	Refrigerator	1,525	2	47	$41
652	Separate freezer	173	0	8	$9
655	Separate ice maker	7	0	1	$0
651	Dishwasher	1,128	2	19	$23
611	Blender, juicer, or food processor	32	0	1	$1
653	Garbage disposer	27	0	1	$0
621	Can opener	21	2	3	$0
612	Coffee grinder	7	0	0	$0
623	Knife sharpener	2	0	0	$0
622	Knife	1	0	1	$0

[1] Does not include 135 fires coded as confined to cooking vessel.

Home Structure Fires (Including Fires Coded as Confined Fires), by Equipment Involved in Ignition (EII)
Annual Average of 2006-2010 Structure Fires Reported to U.S. Fire Departments (Continued)

EII	Type of Equipment	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)
121-152	**HEATING EQUIPMENT**	**62,547**	**516**	**1,579**	**$924**
	Non-confined	*26,550*	*516*	*1,506*	*$916*
	Confined	*35,997*	*0*	*74*	*$8*
125-127	Fireplace, chimney or chimney connector	23,602	29	109	$232
	Non-confined	*4,065*	*29*	*96*	*$228*
	Confined	*6,833*	*0*	*0*	*$2*
	Confined to chimney or flue; no equipment involved in ignition	*12,704*	*0*	*14*	*$2*
120	Unspecified fireplace or chimney	3,330	4	35	$75
127	Metal chimney	2,422	14	13	$54
126	Brick or stone chimney	2,183	0	8	$18
121	Masonry fireplace	1,725	6	21	$39
122	Factory-built fireplace	902	4	15	$36
125	Chimney connector	336	0	3	$8
123-124, 131, 141-143	Space heater	20,252	412	1,060	$477
	Non-confined	*14,336*	*412*	*1,033*	*$476*
	Confined	*5,917*	*0*	*26*	*$1*
124	Heating stove	8,357	116	461	$158
141	Heater excluding oil-filled or catalytic	4,548	220	388	$179
131	Local heating furnace	3,536	23	92	$47
123	Fireplace with insert	2,499	13	43	$50
143	Oil-filled heater	925	24	55	$30
142	Catalytic heater	388	16	21	$12
132-133	Furnace	9,105	26	106	$66
	Non-confined	*2,344*	*26*	*91*	*$64*
	Confined	*6,443*	*0*	*15*	*$2*
	Confined to boiler or burner; no equipment involved in ignition	*318*	*0*	*0*	*$0*
132	Central furnace	6,329	24	95	$58
133	Boiler	2,457	2	11	$7

Home Structure Fires (Including Fires Coded as Confined Fires), by Equipment Involved in Ignition (EII)
Annual Average of 2006-2010 Structure Fires Reported to U.S. Fire Departments (Continued)

EII	Type of Equipment	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)
151	Water heater	6,784	37	264	$120
	Non-confined	*5,028*	*37*	*262*	*$120*
	Confined	*1,756*	*0*	*2*	*$0*
144	Heat lamp	466	9	19	$20
	Non-confined	*466*	*9*	*19*	*$20*
	Confined	*0*	*0*	*0*	*$0*
145	Heat tape	276	2	5	$9
	Non-confined	*276*	*2*	*5*	*$9*
	Confined	*0*	*0*	*0*	*$0*
152	Steamline, heat pipe, or hot air duct	46	0	0	$0
	Non-confined	*36*	*0*	*0*	*$0*
	Confined	*11*	*0*	*0*	*$0*
	Confined to chimney, flue, fuel burner, or boiler but coded as equipment other than heating equipment	*2,016*	*0*	*16*	*$0*
111-117	**AIR CONDITIONING, FAN, OR RELATED EQUIPMENT**	**6,903**	**20**	**245**	**$160**
113	Fan	3,823	13	126	$77
111	Air conditioner	2,364	6	92	$55
112	Heat pump	344	0	6	$12
116	Dehumidifier	220	0	14	$12
114	Humidifier	69	0	4	$2
117	Evaporative cooler or cooling tower	54	0	1	$1
115	Ionizer	28	0	3	$2

Home Structure Fires (Including Fires Coded as Confined Fires), by Equipment Involved in Ignition (EII)
Annual Average of 2006-2010 Structure Fires Reported to U.S. Fire Departments (Continued)

EII	Type of Equipment	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)
210-263	**ELECTRICAL DISTRIBUTION AND LIGHTING EQUIPMENT**	**23,180**	**341**	**950**	**$809**
210-219	Wiring and related equipment	14,425	165	401	$465
210	Unclassified wiring or related equipment	6,118	95	175	$194
217	Outlet or receptacle	2,557	13	79	$76
216	Branch circuit wiring	1,960	22	41	$79
215	Panelboard or switchboard	1,293	21	28	$34
212	Service supply wiring from utility	713	5	18	$23
213	Meter or meter box	594	0	16	$11
214	Wiring from meter box to circuit breaker	499	5	13	$28
211	Power (utility) line	452	5	19	$13
218	Wall switch	208	0	8	$5
219	Ground fault circuit interceptor (GFCI)	33	0	5	$3
231-244	Lamp, light bulb or light fixture	4,794	61	260	$188
230	Unclassified lamp or lighting equipment	1,359	4	57	$53
231	Table, floor, or desktop lamp	988	18	77	$50
233	Incandescent light fixture	919	7	33	$22
238	Light bulb	375	10	13	$7
235	Halogen light fixture	366	2	16	$19
234	Fluorescent light fixture	278	4	26	$14
237	Work or trouble light	187	0	10	$8
242	Decorative light on line voltage	157	9	13	$9
243	Decorative or landscape lighting on low voltage	49	0	0	$2
241	Nightlight	60	0	9	$2
232	Lantern or flashlight	28	5	4	$1
236	Sodium or mercury vapor light	21	0	1	$1
244	Sign	6	0	0	$0

Home Structure Fires (Including Fires Coded as Confined Fires), by Equipment Involved in Ignition (EII)
Annual Average of 2006-2010 Structure Fires Reported to U.S. Fire Departments (Continued)

EII	Type of Equipment	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)
	ELECTRICAL DISTRIBUTION AND LIGHTING EQUIPMENT (Continued)				
260-263	Cord or plug	2,623	106	212	$97
263	Extension cord	1,418	75	135	$55
260	Unclassified cord or plug	450	18	33	$16
262	Permanent power cord or plug	447	4	24	$13
261	Detachable power cord or plug	309	9	21	$13
221-229	Transformer or power supply	1,313	9	76	$58
227	Surge protector	482	0	30	$18
224	Generator	222	9	19	$12
228	Battery charger or rectifier	245	0	19	$14
223	Low voltage transformer	129	0	3	$7
221	Distribution type transformer	75	0	0	$2
229	Battery	69	0	6	$3
222	Overcurrent or disconnect equipment	67	0	0	$1
226	Uninterrupted power supply	20	0	0	$1
225	Inverter	4	0	0	$0
251	Electric fence	13	0	0	$1
253	Lightning rod or arrester	11	0	0	$0
252	Traffic control device	0	0	0	$0

Home Structure Fires (Including Fires Coded as Confined Fires), by Equipment Involved in Ignition (EII)
Annual Average of 2006-2010 Structure Fires Reported to U.S. Fire Departments (Continued)

EII	Type of Equipment	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)
300-599, 700-999	**OTHER APPLIANCES AND EQUIPMENT**				
811, 813, 814	Washer or dryer	15,324	34	425	$209
811	Clothes dryer[2]	14,043	29	396	$191
814	Washing machine	671	4	17	$7
813	Washer/dryer	611	0	12	$10
331-334	Torch or burner	1,751	0	88	$109
334	Soldering equipment	693	0	38	$28
331	Welding torch	526	0	30	$61
332	Cutting torch	255	0	4	$10
333	Burner[3]	277	0	17	$9
730-757	Entertainment equipment	1,630	0	93	$52
753	Television	799	0	44	$26
743	Radio	202	0	4	$4
748	Stereo equipment	163	0	10	$8
741	(Audio) CD player	84	0	9	$2
754	VCR or VCR/TV combination	75	0	6	$2
750	Unclassified video equipment	72	0	9	$2
751	Cable converter box	61	0	0	$1
755	Video game (electronic)	40	0	5	$1
747	Separate audio speakers	38	0	1	$2
745	Phonograph, record player or turntable	14	0	1	$0
756	Camcorder or video camera	13	0	0	$1
742	Laser disk player	12	0	0	$0
730	Unclassified musical instrument	11	0	2	$1
732	Piano or organ	11	0	1	$1

[2] Does not include 1,476 confined fires – 613 confined to trash, 305 confined to burner or boiler, 180 confined to chimney or flue, 225 confined to cooking vessel, 133 confined to incinerator, and 20 confined to compactor.
[3] Does not include 246 burner fires confined to cooking vessel.

Home Structure Fires (Including Fires Coded as Confined Fires), by Equipment Involved in Ignition (EII)
Annual Average of 2006-2010 Structure Fires Reported to U.S. Fire Departments (Continued)

EII	Type of Equipment	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)
	OTHER APPLIANCES AND EQUIPMENT (Continued)				
	Entertainment equipment (continued)				
740	Unclassified sound recording or receiving equipment	8	0	0	$0
733	Musical synthesizer or keyboard	8	0	0	$0
744	Two-way radio	8	0	0	$0
749	Tape recorder or player	6	0	0	$0
757	Photographic camera or equipment	4	0	0	$0
731	Guitar	2	0	0	$0
752	Film or slide projector	0	0	0	$0
850-855	Portable appliance designed to produce controlled heat	1,261	45	127	$52
850	Unclassified portable appliance designed to produce controlled heat	553	28	61	$26
855	Clothes iron	340	0	8	$11
852	Electric blanket	220	15	34	$8
853	Heating pad	140	2	20	$7
854	Clothes steamer	8	0	4	$1
851	Baby bottle warmer	0	0	0	$0
812	Trash compactor	1,256	0	0	$0
812	*Non-confined fire*	*15*	*0*	*0*	*$0*
	Confined fire	*1,241*	*0*	*0*	*$0*
873, 877	Cigarette, pipe or novelty lighter	826	27	155	$26
873	Cigarette or pipe lighter[4]	814	27	152	$26
877	Novelty lighter	12	0	3	$0

[4] Home structure fires involving lighters are estimated much higher using the Heat Source field: 9,430 fires (including 2,431 confined fires), 165 civilian deaths, 839 civilian injuries, and $227 million in direct property damage.

Home Structure Fires (Including Fires Coded as Confined Fires), by Equipment Involved in Ignition (EII)
Annual Average of 2006-2010 Structure Fires Reported to U.S. Fire Departments (Continued)

EII	Type of Equipment	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)
	OTHER APPLIANCES AND EQUIPMENT (Continued)				
710-728	Office equipment	748	9	53	$28
710-716	Computers and related equipment	587	9	36	$23
711	Computer	345	0	13	$13
710	Unclassified computer device	107	9	15	$5
715	Computer printer	60	0	4	$2
714	Computer monitor	53	0	4	$2
716	Computer projection device	8	0	0	$1
712	External computer storage device	8	0	0	$0
713	External computer modem	6	0	0	$1
720-721, 723-728	Other office equipment, not computer or telephone-related	84	0	8	$3
726	Paper shredder	36	0	4	$1
720	Unclassified office equipment	25	0	1	$2
725	Fax machine	11	0	3	$0
728	Typewriter	4	0	0	$0
724	Copier	4	0	0	$0
721	Adding machine or calculator	4	0	0	$0
723	Cash register	0	0	0	$0
727	Postage or shipping meter equipment	0	0	0	$0
722	Telephone or answering machine	77	0	9	$2
352	Incinerator	605	0	4	$1
352	*Non-confined*	*2*	*0*	*0*	*$1*
	Confined to incinerator[5]	*603*	*0*	*4*	*$0*
841-849	Personal care devices	492	7	27	$15
842	Curling iron	238	0	11	$8
845	Hair dryer	180	7	7	$5
844	Hair curler warmer	45	0	7	$1
848	Sunlamp or tanning equipment	11	0	1	$0
846	Lighted makeup mirror	7	0	0	$0
841	Comb or hair brush	4	0	1	$0
847	Razor or shaver	4	0	0	$0
849	Toothbrush	3	0	0	$0

[5] Does not include 10 incinerator fires coded as confined to compactor.

Home Structure Fires (Including Fires Coded as Confined Fires), by Equipment Involved in Ignition (EII)
Annual Average of 2006-2010 Structure Fires Reported to U.S. Fire Departments (Continued)

EII	Type of Equipment	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)
	OTHER APPLIANCES AND EQUIPMENT (Continued)				
843	Electrolysis equipment	0	0	0	$0
511-538	Yard or other outdoor equipment	449	2	10	$29
524	Lawn mower	309	0	10	$23
532	Leaf blower	38	0	0	$1
523	Weed burner	33	0	0	$3
525	Lawn or landscape trimmer or edger	28	2	0	$1
534	Snow blower or thrower	18	0	0	$0
522	Chain saw	9	0	0	$0
521	Farm or garden sprayer	5	0	0	$0
531	Lawn vacuum	3	0	0	$0
538	Tiller or cultivator	2	0	0	$0
513	Farm elevator or conveyor	2	0	0	$0
512	Hay processing equipment	1	0	0	$0
533	Mulcher, grinder, or chipper	1	0	0	$0
511	Combine or threshing machine	0	0	0	$0
514	Silo loader or unloader	0	0	0	$0
515	Feed grinder, mixer, or blender	0	0	0	$0
516	Milking machine	0	0	0	$0
517	Pasteurizer	0	0	0	$0
518	Cream separator	0	0	0	$0
535	Log splitter	0	0	0	$0
536	Post-hole auger	0	0	0	$0
537	Post driver or pile driver	0	0	0	$0

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Annual Average of 2006-2010 Structure Fires Reported to U.S. Fire Departments (Continued)

EII	Type of Equipment	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)
	OTHER APPLIANCES AND EQUIPMENT (Continued)				
311-318	Power tools	341	2	21	$12
316	Power sander, grinder, buffer or polisher	136	0	8	$8
315	Power drill or screwdriver	82	2	5	$3
310	Unclassified power tool	81	0	8	$2
311	Power saw	68	0	4	$0
314	Power cutting tool	51	0	4	$1
313	Power shaper, router, joiner, or planer	2	0	0	$0
312	Power lathe	1	0	0	$0
317	Power hammer	0	0	0	$0
318	Power nail gun	0	0	0	$0
341-342, 344	Pump or compressor	287	2	5	$6
344	Pump	185	0	4	$2
341	Air compressor	99	0	0	$4
342	Gas compressor	3	2	1	$0
410-419	Biomedical equipment	263	81	126	$11
416	Oxygen administration equipment	222	75	113	$9
410	Unclassified medical equipment	22	4	6	$0
419	Therapeutic equipment	11	0	1	$1
411	Dental, medical or other powered bed or chair	7	2	5	$0
412	Unclassified dental equipment	1	0	0	$0
413	Dialysis equipment	0	0	0	$0
414	Medical imaging equipment	0	0	0	$0
415	Medical monitoring equipment	0	0	0	$0
417	X-ray or other radiological equipment	0	0	0	$0
418	Medical sterilizer	0	0	0	$0

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Annual Average of 2006-2010 Structure Fires Reported to U.S. Fire Departments (Continued)

EII	Type of Equipment	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)
	OTHER APPLIANCES AND EQUIPMENT (Continued)				
373, 861-864, 866,868, 876	Control and detection equipment	214	2	11	$9
863	Garage door opener	69	0	3	$3
868	Thermostat	58	0	6	$0
866	Smoke or heat detector	38	0	1	$5
373	Gas regulator	29	2	0	$1
876	Timer	13	0	1	$0
862	Burglar alarm	4	0	0	$0
864	Gas detector	3	0	0	$0
861	Automatic door opener (not garage)	0	0	0	$0
830-834	Floor care equipment	160	0	5	$7
834	Vacuum cleaner	133	0	5	$6
832	Carpet cleaning equipment including rug shampooer	11	0	0	$0
830	Unclassified floor care equipment	9	0	0	$1
833	Floor buffer or waxer	7	0	0	$0
831	Electric broom	1	0	0	$0
821	Hot tub, whirlpool, or spa	133	0	4	$11
871	Ashtray	114	0	7	$2
351	Heat treating equipment	111	0	16	$18
320-325	Painting or coating equipment	71	0	25	$2
320	Unclassified painting tool	36	0	3	$1
324	Paint sprayer	27	0	22	$1
325	Coating machine	7	0	0	$0
321	Paint dipper	0	0	0	$0
322	Paint flow coating machine	0	0	0	$0
323	Paint mixing machine	1	0	0	$0

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Annual Average of 2006-2010 Structure Fires Reported to U.S. Fire Departments (Continued)

EII	Type of Equipment	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)
	OTHER APPLIANCES AND EQUIPMENT (Continued)				
882	Powered toy	54	0	1	$1
423	TV monitor array	53	0	1	$2
822	Swimming pool equipment	50	0	0	$2
433	Elevator or lift	48	0	0	$0
345	Wet/dry vacuum or shop vac	47	0	8	$1
891	Clock	44	0	0	$1
872	Charcoal lighter	41	8	8	$2
374	Separate motor	36	0	0	$0
375	Internal combustion engine	30	0	0	$1
883	Woodburning kit	29	0	0	$1
895	Sewing machine	26	0	0	$1
354	Tarpot or tar kettle	23	0	0	$0
445	Water fountain or water cooler	18	0	0	$1
353	Industrial furnace or kiln	14	0	1	$0
875	Insect trap	11	0	0	$0
896	Shoe polisher	9	0	1	$0
343	Atomizing equipment	8	0	1	$0
881	Model vehicle	8	0	0	$1
340	Unclassified hydraulic equipment	7	0	0	$0
346	Hoist or lift	7	0	0	$0
348	Drilling machinery or equipment	5	0	0	$0
443	Vending machine	4	0	0	$0
422	Telephone switching gear	4	0	0	$0
444	Non-video arcade game	3	0	0	$0
450	Unclassified laboratory equipment	3	0	0	$0
892	Gun	3	0	0	$0
421	Transmitter	2	0	0	$0
425	Studio type sound recording equipment	1	0	0	$0
358	Extractor or waste recovery equipment	1	0	0	$0
377	Car washing equipment	1	0	0	$0
865	Intercom	1	0	0	$0

Home Structure Fires (Including Fires Coded as Confined Fires), by Equipment Involved in Ignition (EII)
Annual Average of 2006-2010 Structure Fires Reported to U.S. Fire Departments (Continued)

EII	Type of Equipment	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)
	OTHER APPLIANCES AND EQUIPMENT (Continued)				
893	Jewelry cleaning machine	1	0	0	$0
894	Scissors	1	0	0	$0
362	Power transfer equipment (rope, cable, or block)	1	0	0	$0
355	Casting, molding or forging equipment	1	0	0	$0
361	Conveyor	1	0	0	$0
372	Testing equipment	1	0	0	$0
376	Printing press	1	0	0	$0
	Contained trash or rubbish fire	*15,049*	*0*	*55*	*$2*
000	Unclassified equipment	1,788	22	62	$71
NNN	No equipment involved; specific non-equipment heat sources reported	75,294	1,085	3,768	$3,743
Total		371,673	2,585	12,907	$7,194

Additional equipment with no reported home structure fires in 2006-2010.

Equipment Involved in Ignition	
347	Powered jacking equipment
356	Distilling equipment
357	Digester or reactor
363	Power take-off
364	Powered valve
365	Bearing or brake
371	Picking, carding or weaving machine
424	Studio type TV camera
426	Radar equipment

Equipment Involved in Ignition	
431	Amusement ride equipment
432	Ski lift
434	Escalator
441	Microfilm or microfiche viewing equipment
442	Photo processing equipment
446	Telescope
451	Electron microscope
874	Fire extinguishing equipment
897	Sterilizer

Home Structure Fires (Including Fires Coded as Confined Fires), by Equipment Involved in Ignition (EII)
Annual Average of 2006-2010 Structure Fires Reported to U.S. Fire Departments (Continued)

Notes on Formats: Types and groups of equipment whose names are indented are parts of the equipment group they are listed under. Equipment types that belong to a listed group are shown with that group, even if they had no reported fires estimated for the period.

Notes on Statistical Methodology: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or sate agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires and civilian deaths and injuries are rounded to the nearest one, and direct property damage is rounded to the nearest million dollars. Damage has not been adjusted for inflation. Figures reflect a proportional share of home fires with equipment involved in ignition unknown, and partial unknowns have been allocated as indicated below. Fires reported as "no equipment" but lacking a confirming specific heat source (codes 40-99) are also treated as unknown equipment and allocated. Fires reported as "no equipment" and having a confirming specific heat source are not shown on the table. Totals may not equal sums because of rounding error.

Notes on Allocations: Equipment Involved in Ignition 100, 200, 300, 400, 500, 600, 700, and 800 are partial unknowns that are proportionally allocated over the known equipment categories defined by the same initial digit (e.g., EII 100 over 101-199). Incident Type 113 (confined cooking vessel fires) are allocated over all known equipment codes, with the fires allocated to cooking equipment shown with those equipment types and the other fires shown together as fires confined to cooking vessel but coded as non-cooking equipment. Incident Types 114 and 116 (confined chimney and boiler fires) are similarly and separately allocated over all known equipment codes, with the fires allocated to heating equipment shown with those equipment types and the other fires shown together as fires confined to heating equipment but coded as non-heating equipment. Incident Types 115 (confined to incinerator) and 117 (confined to trash compactor) are shown with those two types of equipment. Incident Type 118 (confined trash fire) is shown by itself.

Source: NFIRS Version 5.0 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.

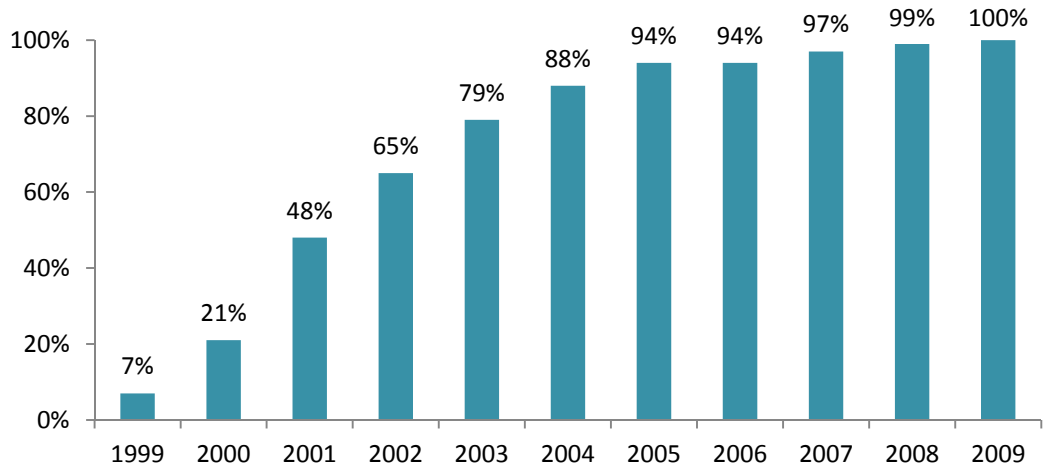
Scaling ratios are obtained by comparing NFPA's projected totals of residential structure fires, non-residential structure fires, vehicle fires, and outside and other fires, and associated civilian deaths, civilian injuries, and direct property damage with comparable totals in NFIRS. Estimates of specific 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. A copy of the article is available online at http://www.nfpa.org/osds or through NFPA's One-Stop Data Shop.

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.