



RESEARCH

Structure Fires Caused by Hot Work

Supporting Tables

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Structure Fires Caused by Hot Work: Supporting Tables

The tables in this document are a companion to the report of the same name. Estimates of home and non-home fires caused by hot work are shown separately for each table. The table topics are listed below.

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The national estimates of fires and losses in this analysis are presented as 2013-2017 annual averages. Estimates were derived from the US Fire Administration’s National Fire Incident Reporting System (NFIRS) and NFPA’s annual fire department experience survey and include proportional shares of unknown or missing data. Fires are rounded to the nearest 10, deaths and injuries are rounded to the nearest one, and property loss is rounded to the nearest million dollars. Property loss was not adjusted for inflation. Percentages were calculated on unrounded estimates. Sums may not equal totals due to rounding errors.

“Confined” fires (fires with NFIRS incident type codes 113-118 indicating 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) were excluded from this analysis. Estimates include proportional shares of fires with unknown data. For more information on how these estimates were calculated, please see the [full report](#) and [How NFPA's National Estimates Are Calculated for Home Structure Fires](#).

Table 1A.
Home Structure Fires Caused by Hot Work, by Occupancy
2013-2017 Annual Averages

Occupancy	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)
One- or two-family dwelling	1,430 (72%)	8 (100%)	52 (63%)	\$55 (55%)
Apartment or multifamily dwelling	570 (28%)	0 (0%)	31 (37%)	\$46 (45%)
Total	2,000 (100%)	8 (100%)	83 (100%)	\$100 (100%)

Note: Sums may not equal totals due to rounding errors. Confined structure fires (NFIRS incident type 113-118) were excluded from this analysis.

Source: NFIRS 5.0 and NFPA’s fire experience survey.

Table 1B.
Non-Home Structure Fires Caused by Hot Work, by Occupancy
2013-2017 Annual Averages

Occupancy	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Manufacturing or processing	650	(25%)	1	(21%)	31	(27%)	\$99	(39%)
Mercantile or office	560	(21%)	1	(17%)	25	(22%)	\$29	(11%)
Service station or vehicle sales, service, or repair	170	(7%)	1	(17%)	11	(10%)	\$16	(6%)
Office, bank, or mail facility	100	(4%)	0	(0%)	4	(3%)	\$1	(1%)
Specialty shop	60	(2%)	0	(0%)	0	(0%)	\$3	(1%)
Grocery or convenience store	40	(2%)	0	(0%)	4	(4%)	\$2	(1%)
Laundry, dry cleaning, professional supplies or services	30	(1%)	0	(0%)	4	(4%)	\$2	(1%)
Department store or unclassified general retail	30	(1%)	0	(0%)	2	(2%)	\$0	(0%)
Personal service, recreational, or home repair	10	(1%)	0	(0%)	0	(0%)	\$1	(0%)
Unclassified or unknown-type mercantile or business	90	(4%)	0	(0%)	0	(0%)	\$3	(1%)
Storage property	560	(21%)	4	(62%)	12	(10%)	\$29	(11%)
Vehicle storage, garage, or fire station	170	(6%)	2	(28%)	6	(6%)	\$13	(5%)
Warehouse, residential or self-storage	110	(4%)	0	(0%)	0	(0%)	\$4	(2%)
Grain or livestock storage	30	(1%)	0	(0%)	0	(0%)	\$5	(2%)
Unclassified storage property	240	(9%)	2	(34%)	5	(4%)	\$7	(3%)
Residential property	180	(7%)	0	(0%)	8	(7%)	\$25	(10%)
Hotel or motel	60	(2%)	0	(0%)	2	(2%)	\$21	(8%)
Dormitory, fraternity, sorority, or barracks	20	(1%)	0	(0%)	3	(2%)	\$0	(0%)
Unclassified or unknown-type residential property	90	(3%)	0	(0%)	4	(3%)	\$3	(1%)

Table 1B.
Non-Home Structure Fires Caused by Hot Work, by Occupancy
2010-2014 Annual Averages (Continued)

Occupancy	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Public assembly	180	(7%)	0	(0%)	2	(2%)	\$21	(8%)
Eating or drinking establishment	80	(3%)	0	(0%)	1	(1%)	\$8	(3%)
Place of worship or funeral property	40	(2%)	0	(0%)	0	(0%)	\$3	(1%)
Library, museum, courthouse, or other public property	10	(1%)	0	(0%)	0	(0%)	\$11	(4%)
Industrial, utility, defense, agriculture, or mining	130	(5%)	0	(0%)	8	(7%)	\$32	(12%)
Agriculture	30	(1%)	0	(0%)	0	(0%)	\$7	(3%)
Utility or distribution system	20	(1%)	0	(0%)	7	(6%)	\$20	(8%)
Laboratory	10	(1%)	0	(0%)	0	(0%)	\$1	(0%)
Unclassified utility, defense, agriculture or mining	50	(2%)	0	(0%)	1	(1%)	\$4	(1%)
Outside or special property	120	(4%)	0	(0%)	3	(2%)	\$7	(3%)
Construction site or oil/gas field	60	(2%)	0	(0%)	1	(1%)	\$2	(1%)
Bridge, tunnel, or outbuilding	20	(1%)	0	(0%)	0	(0%)	\$4	(2%)
Highway, street, or parking area	10	(1%)	0	(0%)	1	(1%)	\$0	(0%)
Educational property	100	(4%)	0	(0%)	7	(6%)	\$9	(3%)
Preschool through grade 12	60	(2%)	0	(0%)	3	(3%)	\$1	(0%)
Adult education or college classroom	20	(1%)	0	(0%)	4	(3%)	\$0	(0%)
Health care, detention, or correction	90	(3%)	0	(0%)	17	(14%)	\$2	(1%)
Hospital or hospice	40	(1%)	0	(0%)	13	(12%)	\$1	(0%)
Clinic or doctor's office	20	(1%)	0	(0%)	2	(2%)	\$1	(0%)
Unclassified or unknown property use	50	(2%)	0	(0%)	2	(2%)	\$3	(1%)
Total	2,630	(100%)	6	(100%)	115	(100%)	\$255	(100%)

Note: Sums may not equal totals due to rounding errors. Confined structure fires (NFIRS incident type 113-118) were excluded from this analysis. Only occupancies with rounded totals of at least 1% of the fires are shown.

Source: NFIRS 5.0 and NFPA's fire experience survey.

Table 2A.
Home Structure Fires Caused by Hot Work, by Equipment Involved in Ignition
2013-2017 Annual Averages

Equipment Involved	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Soldering equipment	650	(32%)	2	(20%)	27	(32%)	\$30	(30%)
Welding torch	640	(32%)	3	(40%)	27	(33%)	\$35	(35%)
Cutting torch	280	(14%)	0	(0%)	9	(11%)	\$15	(15%)
Burner	270	(13%)	0	(0%)	14	(17%)	\$13	(12%)
Heat treating equipment	150	(8%)	3	(40%)	4	(5%)	\$7	(7%)
Tar pot or tar kettle	10	(1%)	0	(0%)	1	(1%)	\$1	(1%)
Power nail gun, stud driver, or stapler	10	(0%)	0	(0%)	0	(0%)	\$0	(0%)
Total	2,000	(100%)	8	(100%)	83	(100%)	\$100	(100%)

Table 2B.
Non-Home Structure Fires Caused by Hot Work, by Equipment Involved in Ignition
2013-2017 Annual Averages

Equipment Involved	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Welding torch	1,030	(39%)	6	(100%)	48	(41%)	\$97	(38%)
Cutting torch	710	(27%)	0	(0%)	22	(19%)	\$57	(23%)
Heat treating equipment	450	(17%)	0	(0%)	21	(18%)	\$54	(21%)
Burner	250	(10%)	0	(0%)	22	(20%)	\$19	(7%)
Soldering equipment	160	(6%)	0	(0%)	2	(2%)	\$28	(11%)
Tar pot or tar kettle	20	(1%)	0	(0%)	0	(0%)	\$1	(0%)
Power nail gun, stud driver, or stapler	0	(0%)	0	(0%)	0	(0%)	\$0	(0%)
Total	2,630	(100%)	6	(100%)	115	(100%)	\$255	(100%)

Note: Fires in which the equipment involved in ignition was unknown or not reported have been allocated proportionally among fires with known equipment involved. Fires in which the equipment involved in ignition was entered as none but the heat source indicated equipment involvement or the heat source was unknown were also treated as unknown and allocated proportionally among fires with known equipment involved. Fires with unclassified shop tools and industrial equipment (NFIRS equipment involved in ignition code 300) were allocated proportionally among fires, specific shop tools, and industrial equipment. Sums may not equal totals due to rounding errors. Confined structure fires (NFIRS incident type 113-118) were excluded from this analysis.

Source: NFIRS 5.0 and NFPA's fire experience survey.

Table 3A.
Home Structure Fires Caused by Hot Work, by Structure Status
2013-2017 Annual Averages

Structure Status	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
In normal use	1,660	(83%)	8	(100%)	79	(96%)	\$75	(75%)
Under construction	130	(7%)	0	(0%)	0	(0%)	\$16	(16%)
Under major renovation	100	(5%)	0	(0%)	3	(3%)	\$3	(3%)
Vacant and secured	60	(3%)	0	(0%)	1	(1%)	\$6	(6%)
Idle or not routinely used	20	(1%)	0	(0%)	0	(0%)	\$1	(1%)
Being demolished	20	(1%)	0	(0%)	0	(0%)	\$0	(0%)
Unclassified structure status	10	(1%)	0	(0%)	0	(0%)	\$0	(0%)
Vacant and unsecured	10	(0%)	0	(0%)	0	(0%)	\$0	(0%)
Total	2,000	(100%)	8	(100%)	83	(100%)	\$100	(100%)

Table 3B.
Non-Home Structure Fires Caused by Hot Work, by Structure Status
2013-2017 Annual Averages

Structure Status	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
In normal use	2,070	(79%)	6	(100%)	113	(98%)	\$208	(82%)
Under construction	190	(7%)	0	(0%)	1	(1%)	\$18	(7%)
Under major renovation	150	(6%)	0	(0%)	1	(1%)	\$25	(10%)
Being demolished	70	(3%)	0	(0%)	0	(0%)		
Vacant and secured	60	(2%)	0	(0%)	0	(0%)	\$1	(0%)
Idle or not routinely used	40	(2%)	0	(0%)	0	(0%)	\$0	(0%)
Unclassified structure status	30	(1%)	0	(0%)	0	(0%)	\$0	(0%)
Vacant and unsecured	20	(1%)	0	(0%)	0	(0%)	\$1	(0%)
Total	2,630	(100%)	6	(100%)	115	(100%)	\$255	(100%)

Note: Sums may not equal totals due to rounding errors. Confined structure fires (NFIRS incident type 113-118) were excluded from this analysis.

Source: NFIRS 5.0 and NFPA's fire experience survey.

Table 4A.
Home Structure Fires Caused by Hot Work, by Area of Origin
2013-2017 Annual Averages

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Wall assembly or concealed space	310	(16%)	0	(0%)	8	(10%)	\$18	(18%)
Bathroom or lavatory	260	(13%)	0	(0%)	14	(17%)	\$12	(12%)
Kitchen or cooking area	160	(8%)	2	(20%)	9	(11%)	\$5	(5%)
Exterior roof surface	150	(7%)	0	(0%)	5	(6%)	\$8	(8%)
Garage or vehicle storage area	140	(7%)	2	(20%)	12	(15%)	\$7	(7%)
Exterior wall surface	140	(7%)	0	(0%)	0	(0%)	\$15	(15%)
Crawl space or substructure space	120	(6%)	2	(20%)	10	(12%)	\$5	(5%)
Ceiling/floor assembly or concealed space	70	(4%)	0	(0%)	3	(3%)	\$1	(1%)
Attic or ceiling/roof assembly or concealed space	70	(3%)	0	(0%)	0	(0%)	\$10	(10%)
Bedroom	60	(3%)	0	(0%)	6	(8%)	\$4	(4%)
Laundry room or area	50	(2%)	0	(0%)	0	(0%)	\$1	(1%)
Living room, family room, or den	40	(2%)	2	(20%)	0	(0%)	\$1	(1%)
Exterior balcony or unenclosed porch	40	(2%)	0	(0%)	0	(0%)	\$0	(0%)
Unclassified function area	30	(2%)	0	(0%)	1	(1%)	\$0	(0%)
Unclassified outside area	30	(2%)	0	(0%)	0	(0%)	\$1	(1%)
Conduit, pipe, utility, or ventilation shaft	30	(2%)	0	(0%)	1	(1%)	\$1	(1%)
Other known area of origin	310	(16%)	2	(20%)	13	(16%)	\$12	(12%)
Total	2,000	(100%)	8	(100%)	83	(100%)	\$100	(100%)

Note: Sums may not equal totals due to rounding errors. Confined structure fires (NFIRS incident type 113-118) were excluded from this analysis.

Source: NFIRS 5.0 and NFPA's fire experience survey.

Table 4B.
Non-Home Structure Fires Caused by Hot Work, by Area of Origin
2013-2017 Annual Averages

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Exterior roof surface	310	(12%)	0	(0%)	3	(3%)	\$26	(10%)
Processing or manufacturing area or workroom	280	(11%)	1	(17%)	11	(9%)	\$73	(29%)
Maintenance or paint shop area	200	(8%)	1	(17%)	19	(17%)	\$21	(8%)
Garage or vehicle storage area	160	(6%)	2	(28%)	10	(9%)	\$13	(5%)
Wall assembly or concealed space	120	(5%)	0	(0%)	3	(3%)	\$5	(2%)
Unclassified equipment or service area	120	(5%)	0	(0%)	7	(6%)	\$34	(13%)
Machinery room or area or elevator machinery room	100	(4%)	0	(0%)	1	(1%)	\$8	(3%)
Unclassified storage area	100	(4%)	0	(0%)	1	(1%)	\$3	(1%)
Exterior wall surface	80	(3%)	0	(0%)	3	(2%)	\$2	(1%)
Ceiling/floor assembly or concealed space	70	(3%)	0	(0%)	1	(1%)	\$7	(3%)
Unclassified structural area	60	(2%)	0	(0%)	0	(0%)	\$12	(5%)
Storage room, area, tank, or bin	60	(2%)	1	(21%)	1	(1%)	\$0	(0%)
Construction or renovation area	60	(2%)	0	(0%)	0	(0%)	\$2	(1%)
Storage of supplies or tools or dead storage	50	(2%)	0	(0%)	3	(2%)	\$0	(0%)
Duct for HVAC, cable, exhaust, heating, or AC	50	(2%)	0	(0%)	1	(1%)	\$2	(1%)
Attic or ceiling/roof assembly or concealed space	40	(2%)	0	(0%)	4	(3%)	\$1	(1%)
Unclassified outside area	40	(2%)	0	(0%)	0	(0%)	\$0	(0%)
Crawl space or substructure space	40	(2%)	0	(0%)	15	(13%)	\$3	(1%)
Other known area of origin	670	(25%)	1	(17%)	31	(27%)	\$44	(17%)
Total	2,630	(100%)	6	(100%)	115	(100%)	\$255	(100%)

Note: Sums may not equal totals due to rounding errors. Confined structure fires (NFIRS incident type 113-118) were excluded from this analysis.

Source: NFIRS 5.0 and NFPA's fire experience survey.

Table 5A.
Home Structure Fires Caused by Hot Work, by Item First Ignited
2013-2017 Annual Averages

Item First Ignited	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Structural member or framing	490	(24%)	4	(50%)	19	(23%)	\$22	(22%)
Insulation within structural area	410	(21%)	0	(0%)	16	(19%)	\$19	(19%)
Exterior wall covering or finish	180	(9%)	0	(0%)	1	(1%)	\$19	(19%)
Unclassified structural component or finish	150	(7%)	0	(0%)	1	(1%)	\$4	(3%)
Exterior roof covering or finish	130	(6%)	0	(0%)	5	(6%)	\$6	(6%)
Flammable or combustible liquids or gases, piping or filter	100	(5%)	0	(0%)	15	(18%)	\$9	(9%)
Unclassified item first ignited	70	(4%)	0	(0%)	1	(1%)	\$3	(3%)
Cooking materials, including food	50	(2%)	0	(0%)	4	(5%)	\$1	(1%)
Interior wall covering, excluding drapes	50	(2%)	0	(0%)	3	(4%)	\$1	(1%)
Exterior trim, including doors	40	(2%)	0	(0%)	0	(0%)	\$4	(4%)
Multiple items first ignited	30	(2%)	0	(0%)	2	(2%)	\$3	(3%)
Other known item first ignited	310	(16%)	4	(50%)	16	(19%)	\$10	(10%)
Total	2,000	(100%)	8	(100%)	83	(100%)	\$100	(100%)

Note: Sums may not equal totals due to rounding errors. Confined structure fires (NFIRS incident type 113-118) were excluded from this analysis.

Source: NFIRS 5.0 and NFPA's fire experience survey.

Table 5B.
Non-Home Structure Fires Caused by Hot Work, by Item First Ignited
2013-2017 Annual Averages

Item First Ignited	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Flammable or combustible liquids or gases, piping, or filter	430	(16%)	5	(83%)	60	(52%)	\$70	(28%)
Exterior roof covering or finish	270	(10%)	0	(0%)	2	(2%)	\$36	(14%)
Insulation within structural area	240	(9%)	0	(0%)	4	(3%)	\$12	(5%)
Structural member or framing	210	(8%)	0	(0%)	1	(1%)	\$7	(3%)
Dust, fiber, lint, including sawdust or excelsior	140	(5%)	0	(0%)	12	(11%)	\$5	(2%)
Unclassified item first ignited	140	(5%)	0	(0%)	4	(3%)	\$5	(2%)
Exterior wall covering or finish	120	(4%)	0	(0%)	0	(0%)	\$1	(1%)
Unclassified structural component or finish	90	(3%)	0	(0%)	3	(2%)	\$3	(1%)
Multiple items first ignited	80	(3%)	0	(0%)	0	(0%)	\$8	(3%)
Box, carton, bag, basket, or barrel	80	(3%)	0	(0%)	6	(5%)	\$2	(1%)
Material being used to make a product	70	(3%)	0	(0%)	1	(1%)	\$3	(1%)
Interior wall covering, excluding drapes	70	(3%)	0	(0%)	4	(3%)	\$52	(20%)
Rubbish, trash, or waste	60	(2%)	0	(0%)	1	(1%)	\$4	(1%)
Light vegetation, including grass	50	(2%)	0	(0%)	1	(1%)	\$2	(1%)
Interior ceiling cover or finish	50	(2%)	0	(0%)	1	(1%)	\$9	(4%)
Unclassified organic materials	50	(2%)	0	(0%)	0	(0%)	\$10	(4%)
Electrical wire or cable insulation	40	(2%)	0	(0%)	0	(0%)	\$4	(2%)
Other known item first ignited	440	(17%)	1	(17%)	13	(12%)	\$19	(7%)
Total	2,630	(100%)	6	(100%)	115	(100%)	\$255	(100%)

Note: Sums may not equal totals due to rounding errors. Confined structure fires (NFIRS incident type 113-118) were excluded from this analysis.

Source: NFIRS 5.0 and NFPA's fire experience survey.

Table 6A.
Home Structure Fires Caused by Hot Work, by Factor Contributing to Ignition
2013-2017 Annual Averages

Factor Contributing to Ignition	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Heat source too close to combustibles	950	(47%)	3	(33%)	34	(41%)	\$43	(43%)
Cutting or welding too close to combustibles	590	(30%)	3	(33%)	20	(25%)	\$36	(36%)
Equipment not being operated properly	110	(6%)	0	(0%)	6	(7%)	\$6	(6%)
Unclassified misuse of material or product	90	(4%)	0	(0%)	4	(5%)	\$3	(3%)
Equipment unattended	60	(3%)	3	(34%)	1	(1%)	\$1	(1%)
Unclassified factor contributed to ignition	40	(2%)	0	(0%)	2	(2%)	\$2	(2%)
Electrical failure or malfunction	40	(2%)	0	(0%)	1	(1%)	\$1	(1%)
Unclassified operational deficiency	40	(2%)	0	(0%)	2	(2%)	\$3	(3%)
Equipment used for not intended purpose	30	(2%)	0	(0%)	3	(3%)	\$1	(1%)
Mechanical failure or malfunction	30	(2%)	0	(0%)	12	(15%)	\$6	(6%)
Accidentally turned on or not turned off	30	(2%)	0	(0%)	4	(4%)	\$1	(1%)
Other known factor contributing to ignition	140	(7%)	0	(0%)	10	(13%)	\$8	(8%)
Total fires	2,000	(100%)	8	(100%)	83	(100%)	\$100	(100%)
Total factors	2,160	(108%)	8	(100%)	99	(119%)	\$112	(111%)

Note: Multiple entries are allowed, which can result in sums higher than totals. Fires in which the factor contributing to ignition was coded as “none,” “undetermined”, or not reported have been allocated proportionally among fires with known factor contributing to ignition. Sums may not equal totals due to rounding errors. Confined structure fires (NFIRS incident type 113-118) were excluded from this analysis.

Source: NFIRS 5.0 and NFPA’s fire experience survey.

Table 6B.
Non-Home Structure Fires Caused by Hot Work, by Factor Contributing to Ignition
2013-2017 Annual Averages

Factor Contributing to Ignition	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Cutting or welding too close to combustibles	1,100	(42%)	6	(100%)	49	(42%)	\$117	(46%)
Heat source too close to combustibles	650	(25%)	0	(0%)	32	(28%)	\$40	(16%)
Mechanical failure or malfunction	210	(8%)	0	(0%)	11	(10%)	\$18	(7%)
Electrical failure or malfunction	150	(6%)	0	(0%)	1	(1%)	\$34	(13%)
Equipment not being operated properly	100	(4%)	0	(0%)	2	(2%)	\$3	(1%)
Failure to clean	80	(3%)	0	(0%)	14	(12%)	\$5	(2%)
Equipment unattended	80	(3%)	0	(0%)	1	(1%)	\$3	(1%)
Unclassified factor contributed to ignition	60	(2%)	0	(0%)	4	(3%)	\$3	(1%)
Unclassified operational deficiency	50	(2%)	0	(0%)	1	(1%)	\$15	(6%)
Unclassified misuse of material or product	50	(2%)	0	(0%)	3	(3%)	\$4	(2%)
Total fires	2,630	(100%)	6	(100%)	115	(100%)	\$255	(100%)
Total factors	2,800	(107%)	6	(100%)	139	(120%)	\$266	(105%)

Note: Multiple entries are allowed which can result in sums higher than totals. Fires in which the factor contributing to ignition was coded as “none,” unknown, or not reported have been allocated proportionally among fires with known factor contributing to ignition. Sums may not equal totals due to rounding errors. Confined structure fires (NFIRS incident type 113-118) were excluded from this analysis.

Source: NFIRS 5.0 and NFPA’s fire experience survey.

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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.

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