

# Housing Completions

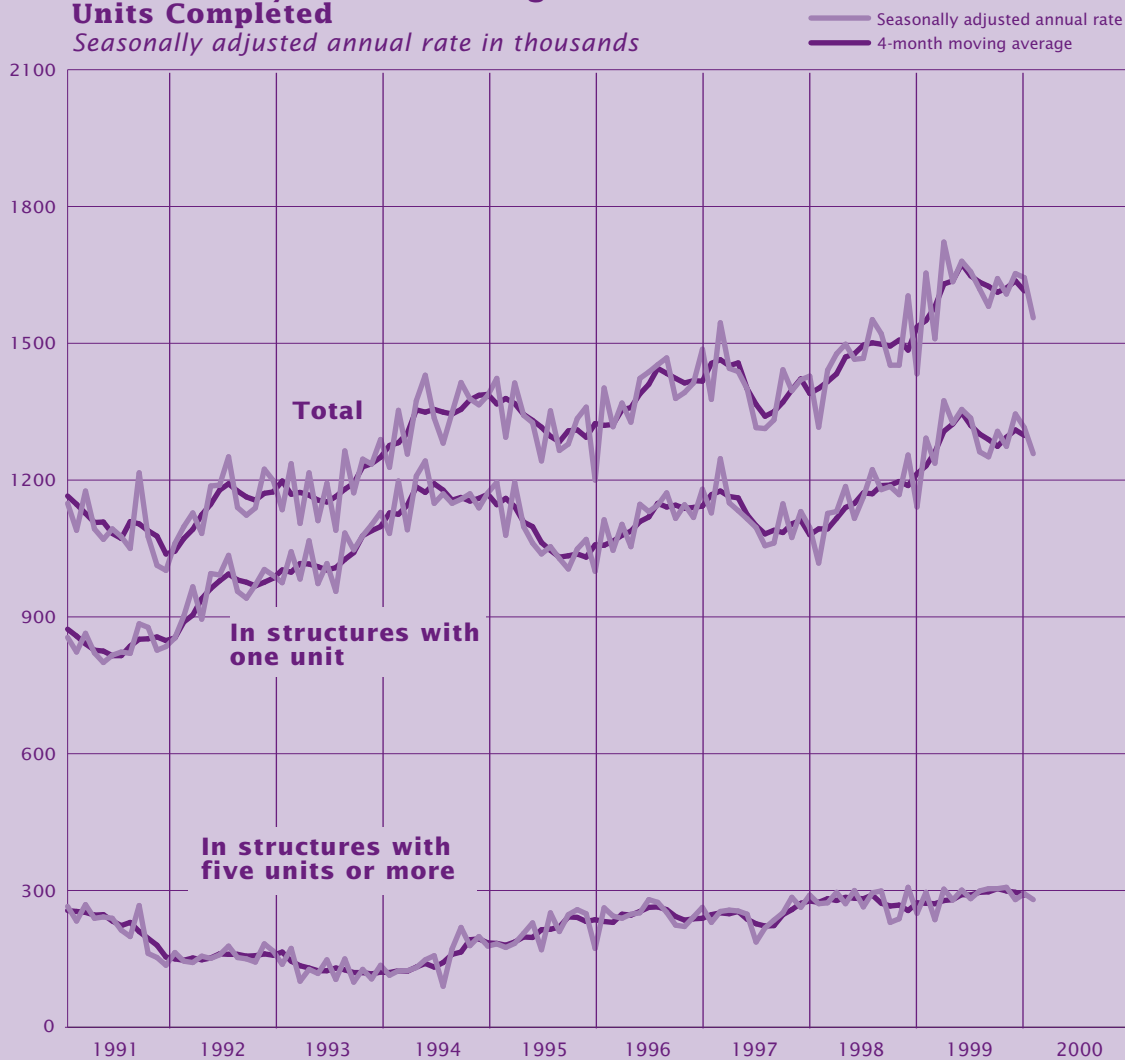
C22/00-1

## Current Construction Reports

Seasonally adjusted data back to January 1997 have been revised. See the appendix for a description of seasonal adjustment and new seasonal factors.

### New Privately Owned Housing Units Completed

Seasonally adjusted annual rate in thousands



Note: Total includes units started in structures with two to four units.

Source: U.S. Census Bureau, Housing Completions.

Questions regarding these data may be directed to **Dale R. Jacobson**, Residential Construction Branch, Manufacturing and Construction Division, telephone: 301-457-1321.

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington DC 20402.

---

## SUMMARY OF FINDINGS

This report provides monthly statistics on the number of new privately owned housing units completed and under construction. This report is released jointly by the U.S. Census Bureau and the U.S. Department of Housing and Urban Development.

Privately owned housing units were completed in January 2000 at a seasonally adjusted annual rate of 1,556,000. This is 5 ( $\pm 7$ ) percent below the revised December 1999 rate of 1,644,000, and is 6 ( $\pm 7$ ) percent below the revised January 1999 rate of 1,654,000.

The January 2000 rate of single-family housing completions was 1,258,000. This is 4 ( $\pm 7$ ) percent below the revised December 1999 rate of 1,315,000. The rate for units in buildings with five units or more was 280,000, and the rate for units in buildings with two to four units was 18,000.

The seasonally adjusted estimate of housing units under construction at the end of January 2000 was 1,041,000. This is 1 ( $\pm 1$ ) percent above the revised December 1999 estimate of 1,028,000. Of these, 720,000 were single-family structures, 298,000 were in buildings with five units or more, and 23,000 were in buildings with two to four units.

## EXPLANATION

The statistics in this report are estimated from sample surveys and are subject to sampling variability as well as nonsampling error including bias and variance from response, nonreporting and undercoverage.

Estimated average relative standard errors of preliminary data are shown in the tables. Whenever a statement such as "2 ( $\pm 3$ ) percent above" appears in the text, this indicates the range (-1 to +5 percent) in which the actual percent change is likely to have occurred. All ranges given for percent changes are 90-percent confidence intervals and account only for sampling variability. If a range contains zero, it is unclear whether there was an increase or decrease; that is, the change is not statistically significant. For any comparison cited without a confidence interval, the change is statistically significant.

In interpreting changes in the seasonally adjusted rates of housing completions, note that month-to-month changes may reflect movements which may be irregular. It may take 4 months to establish an underlying trend for total completions.

The appendix in this report includes explanations of confidence intervals and sampling variability. On average, the preliminary seasonally adjusted estimates of total housing completions are revised about  $\pm 1$  percent.

Housing completions and under construction statistics do not include HUD-coded manufactured homes.

## HISTORICAL DATA

Housing completions data have been collected since 1968. Housing starts are available from 1889 to the present date. Historical data for all these series are available from the Residential Construction Branch, Manufacturing and Construction Division, U.S. Census Bureau, Washington, DC 20233-6900. Telephone: 301-457-1321.

**Table 1. New Privately Owned Housing Units Completed**

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

Period	Total	In structures with—				Inside MSAs <sup>1</sup>	Outside MSAs <sup>1</sup>	North-east	Midwest	South	West
		1 unit	2 units	3 and 4 units	5 units or more						
<b>ANNUAL DATA</b>											
1990	1,308.0	966.0	16.5	28.2	297.3	1,060.2	247.7	157.7	263.3	510.7	376.3
1991	1,090.8	837.6	16.9	19.7	216.6	862.1	228.7	120.1	240.4	438.9	291.3
1992	1,157.5	963.6	15.1	20.8	158.0	909.5	248.0	136.4	268.4	462.4	290.3
1993	1,192.7	1,039.4	9.5	16.7	127.1	943.0	249.8	117.6	273.3	512.0	290.0
1994	1,346.9	1,160.3	12.1	19.5	154.9	1,086.3	260.6	123.4	307.1	580.9	335.5
1995	1,312.6	1,065.5	14.8	19.8	212.4	1,065.0	247.6	126.9	287.9	581.1	316.7
1996	1,412.9	1,128.5	13.6	19.5	251.3	1,163.4	249.4	125.1	304.5	637.1	346.2
1997	1,400.5	1,116.4	13.6	23.4	247.1	1,152.8	247.7	134.0	295.9	634.1	336.4
1998	1,474.2	1,159.7	16.2	24.4	273.9	1,228.5	245.7	137.3	305.1	671.6	360.2
1999 <sup>r</sup>	1,633.7	1,305.3	11.9	25.2	291.3	1,376.0	257.7	145.5	336.6	749.5	402.1
<b>MONTHLY DATA</b>											
<b>Not Seasonally Adjusted</b>											
1999:											
January	114.9	90.2	0.8	3.7	20.2	97.5	17.4	8.9	20.4	57.5	28.0
February	103.0	84.9	1.2	1.4	15.6	85.6	17.4	8.2	18.8	51.9	24.1
March	130.6	103.9	0.7	3.8	22.2	108.6	22.0	11.2	26.4	59.3	33.7
April	125.3	100.9	1.0	1.5	21.8	104.3	21.0	12.3	25.1	55.6	32.3
May	136.1	109.1	0.7	1.2	25.2	117.0	19.1	14.9	28.6	61.7	31.0
June	144.9	116.2	0.8	2.4	25.4	122.2	22.7	13.2	30.1	64.4	37.1
July	138.9	106.1	1.5	3.1	28.1	117.9	21.0	13.5	27.4	63.4	34.5
August	144.1	111.0	1.5	0.8	30.7	122.4	21.7	13.2	31.0	69.1	30.7
September	148.5	119.2	0.8	1.9	26.6	124.3	24.2	13.0	32.8	64.4	38.3
October	147.2	117.9	0.5	2.0	26.8	125.4	21.8	10.5	31.3	68.0	37.4
November <sup>r</sup>	144.0	119.8	1.1	1.3	21.8	119.7	24.3	13.2	31.7	64.0	35.1
December <sup>r</sup>	156.2	126.2	1.2	2.0	26.8	131.2	25.0	13.3	33.1	70.1	39.7
2000:											
January <sup>p</sup>	108.5	88.0	0.6	0.7	19.3	92.7	15.8	9.8	23.2	51.2	24.4
<b>Seasonally Adjusted Annual Rate</b>											
1997: <sup>r</sup>											
January	1,377	1,128	19		230	(NA)	(NA)	122	321	592	342
February	1,545	1,247	44		254	(NA)	(NA)	156	336	701	352
March	1,445	1,150	38		257	(NA)	(NA)	198	277	642	328
April	1,438	1,133	50		255	(NA)	(NA)	119	300	680	339
May	1,400	1,115	37		248	(NA)	(NA)	150	287	602	361
June	1,315	1,096	32		187	(NA)	(NA)	127	275	583	330
July	1,313	1,056	39		218	(NA)	(NA)	131	287	581	314
August	1,332	1,062	35		235	(NA)	(NA)	119	301	579	333
September	1,442	1,148	43		251	(NA)	(NA)	137	291	707	307
October	1,396	1,074	37		285	(NA)	(NA)	122	304	634	336
November	1,420	1,131	26		263	(NA)	(NA)	124	299	647	350
December	1,428	1,096	42		290	(NA)	(NA)	123	288	668	349
1998: <sup>r</sup>											
January	1,316	1,018	27		271	(NA)	(NA)	136	270	581	329
February	1,441	1,127	41		273	(NA)	(NA)	124	327	653	337
March	1,477	1,131	50		296	(NA)	(NA)	119	349	634	375
April	1,498	1,186	41		271	(NA)	(NA)	127	330	728	313
May	1,465	1,116	49		300	(NA)	(NA)	133	321	669	342
June	1,467	1,163	40		264	(NA)	(NA)	141	302	679	345
July	1,552	1,223	34		295	(NA)	(NA)	127	354	700	371
August	1,521	1,179	43		299	(NA)	(NA)	149	296	707	369
September	1,452	1,186	36		230	(NA)	(NA)	150	255	684	363
October	1,452	1,168	46		238	(NA)	(NA)	136	288	651	377
November	1,604	1,255	42		307	(NA)	(NA)	149	299	725	431
December	1,433	1,141	42		250	(NA)	(NA)	147	293	636	357
1999: <sup>r</sup>											
January	1,654	1,292	66		296	(NA)	(NA)	127	308	823	396
February	1,510	1,237	37		236	(NA)	(NA)	121	308	739	342
March	1,722	1,374	45		303	(NA)	(NA)	164	384	738	436
April	1,635	1,325	31		279	(NA)	(NA)	170	327	716	422
May	1,680	1,355	24		301	(NA)	(NA)	174	359	761	386
June	1,657	1,336	39		282	(NA)	(NA)	153	338	739	427
July	1,619	1,262	58		299	(NA)	(NA)	158	321	743	397
August	1,581	1,251	26		304	(NA)	(NA)	155	325	758	343
September	1,642	1,307	31		304	(NA)	(NA)	136	335	740	431
October	1,608	1,274	27		307	(NA)	(NA)	114	328	759	407
November	1,653	1,345	28		280	(NA)	(NA)	143	345	750	415
December	1,644	1,315	36		293	(NA)	(NA)	135	354	740	415
2000:											
January <sup>p</sup>	1,556	1,258	18		280	(NA)	(NA)	139	347	729	341
<b>AVERAGE RELATIVE STANDARD ERRORS<sup>2</sup></b>											
Annual	(percent)	1	1	7	10	3	1	4	3	3	1
Monthly	(percent)	3	3	25	31	9	3	9	9	4	4

NA Not available. <sup>p</sup>Preliminary. <sup>r</sup>Revised.

<sup>1</sup>Metropolitan statistical areas.

<sup>2</sup>Average Relative Standard Errors (Avg. RSE): Annual—Avg. RSE for the last 2 years; Monthly—Avg. RSE for the latest 6-month period (January through June or July through December).

Table 2. New Privately Owned Housing Units Completed by Location and Type of Structure

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

Period	United States			Inside MSAs <sup>1</sup>			Outside MSAs <sup>1</sup>			Northeast			Midwest			South			West		
	Total <sup>2</sup>	In structures with—		Total <sup>2</sup>	In structures with—		Total <sup>2</sup>	In structures with—		Total <sup>2</sup>	In structures with—		Total <sup>2</sup>	In structures with—		Total <sup>2</sup>	In structures with—		Total <sup>2</sup>	In structures with—	
		1 unit	5 units or more		1 unit	5 units or more		1 unit	5 units or more		1 unit	5 units or more		1 unit	5 units or more		1 unit	5 units or more		1 unit	5 units or more
<b>ANNUAL DATA</b>																					
1980	1,502	957	426	1,079	633	359	423	324	67	146	100	38	274	170	80	696	455	196	386	233	113
1981	1,266	819	336	888	530	278	377	289	57	127	87	31	218	140	57	626	408	165	294	183	82
1982	1,006	632	293	708	409	241	297	223	52	120	79	35	143	92	38	539	340	156	203	121	64
1983	1,390	924	374	1,074	674	326	316	249	49	139	106	25	201	142	46	746	476	220	305	200	83
1984	1,652	1,025	515	1,317	771	460	336	255	55	168	129	30	221	156	50	867	508	298	396	233	137
1985	1,703	1,072	534	1,422	853	491	281	220	43	214	168	33	230	151	65	812	514	254	447	239	182
1986	1,756	1,120	550	1,502	918	513	254	202	37	254	193	47	270	170	84	764	505	226	469	253	193
1987	1,669	1,123	475	1,420	917	444	248	206	30	257	196	47	302	201	86	660	467	171	449	259	170
1988	1,530	1,085	389	1,286	876	365	244	208	24	250	188	50	280	191	76	595	457	121	405	248	142
1989	1,423	1,026	338	1,181	823	312	242	203	25	219	159	48	267	191	62	549	420	112	387	257	115
1990	1,308	966	297	1,060	759	267	248	207	30	158	127	23	263	195	57	511	389	109	376	255	108
1991	1,091	838	217	862	642	194	229	196	22	120	100	14	240	185	45	439	348	81	291	205	76
1992	1,158	964	158	910	752	133	248	212	25	136	114	18	268	218	40	462	400	52	290	232	49
1993	1,193	1,039	127	943	818	106	250	222	21	118	105	10	273	232	33	512	456	49	290	247	35
1994	1,347	1,160	155	1,086	929	135	261	232	20	123	113	7	307	255	42	581	507	64	336	285	42
1995	1,313	1,066	212	1,065	848	191	248	217	21	127	108	16	288	232	44	581	472	99	317	253	54
1996	1,413	1,129	251	1,163	913	226	249	215	25	125	108	14	304	245	48	637	507	120	346	269	69
1997	1,400	1,116	247	1,153	904	221	248	212	26	134	115	14	296	236	47	634	506	118	336	259	68
1998	1,474	1,160	274	1,229	951	248	246	208	26	137	116	16	305	244	47	672	517	142	360	283	69
1999 <sup>3</sup>	1,634	1,305	291	1,376	1,077	269	258	228	22	145	119	21	337	282	43	750	587	150	402	317	77
<b>QUARTERLY DATA</b>																					
1996: 1st quarter	293	235	52	243	192	47	50	44	5	24	21	3	56	45	9	136	108	26	77	61	15
2nd quarter	342	270	66	285	222	59	57	48	7	29	25	3	73	55	16	156	124	30	84	66	17
3rd quarter	382	301	71	314	243	64	69	59	7	32	28	3	88	68	16	169	134	32	94	71	20
4th quarter	394	322	63	321	257	57	74	65	6	40	34	5	87	76	8	177	141	32	91	71	17
1997: 1st quarter	310	251	51	255	204	45	55	47	5	32	27	5	61	48	10	143	120	20	74	56	16
2nd quarter	338	271	57	279	221	51	59	51	6	32	28	3	70	57	10	152	121	28	83	65	16
3rd quarter	363	287	66	302	235	59	61	52	7	35	30	(S)	81	63	15	163	128	32	84	66	16
4th quarter	389	307	73	316	244	65	72	63	7	35	31	(S)	83	68	12	176	136	38	94	72	20
1998: 1st quarter	300	234	58	250	193	52	50	40	6	26	22	3	62	47	10	137	104	31	76	60	15
2nd quarter	362	281	70	304	233	63	58	49	7	33	27	4	78	61	13	170	128	39	81	65	14
3rd quarter	403	315	78	338	260	71	65	56	8	38	33	4	83	65	16	184	142	39	98	76	20
4th quarter	409	330	68	337	266	62	72	64	6	41	34	5	82	70	8	181	144	33	105	81	21
1999: 1st quarter	348	279	58	292	230	53	57	49	5	28	24	3	66	54	8	169	132	32	86	69	14
2nd quarter	406	326	72	343	270	67	63	56	5	40	33	6	84	71	10	182	144	36	100	78	20
3rd quarter	431	336	85	365	278	79	67	59	6	40	32	6	91	73	15	197	151	43	104	80	22
4th quarter <sup>4</sup>	447	364	75	376	300	70	71	64	5	37	30	5	96	83	10	202	160	39	112	90	20
<b>AVERAGE RELATIVE STANDARD ERRORS<sup>3</sup></b>																					
Annual . . . . .(percent) . .	1	1	3	1	1	3	4	4	13	3	2	14	3	3	10	2	4	1	1	3	
Quarterly . . . . .(percent) . .	2	2	6	2	2	6	6	6	25	6	6	14	5	5	18	3	3	9	3	3	7

<sup>1</sup>Revised. S Withheld because estimate did not meet publication standards on the basis of response rate, associated standard error, or a consistency review.<sup>2</sup>Metropolitan statistical areas.<sup>3</sup>Includes units completed in structures with two to four units.<sup>4</sup>Average Relative Standard Errors (Avg. RSE): Annual—Avg. RSE for the last 2 years; Quarterly—Avg. RSE for the latest 2-quarter period (quarter 1 through quarter 2 or quarter 3 through quarter 4).

**Table 3. New Privately Owned Housing Units Under Construction**

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

Period	Total	In structures with—				Inside MSAs <sup>1</sup>	Outside MSAs <sup>1</sup>	North-east	Midwest	South	West
		1 unit	2 units	3 and 4 units	5 units or more						
<b>ANNUAL DATA</b>											
1990	711.4	449.1	10.9	15.1	236.3	553.9	157.5	121.6	133.4	242.3	214.1
1991	606.3	433.5	9.1	14.5	149.2	458.4	147.9	103.9	122.4	208.5	171.6
1992	612.4	472.7	5.6	11.3	122.8	453.1	159.4	81.4	137.8	228.4	164.8
1993	680.1	543.0	6.5	12.4	118.2	521.0	159.1	89.3	154.4	265.4	170.9
1994	762.2	557.8	9.1	12.9	182.5	597.6	164.5	96.3	173.5	312.1	180.3
1995	775.9	547.2	8.4	12.7	207.7	620.1	155.8	86.3	172.0	331.4	186.3
1996	792.3	550.0	9.0	19.1	214.3	629.9	162.4	85.2	178.0	337.6	191.4
1997	846.7	554.6	11.2	20.7	260.2	683.5	163.2	87.1	181.9	364.8	213.0
1998	970.8	659.1	8.3	20.5	282.9	794.8	176.0	98.5	201.2	428.5	242.6
1999 <sup>f</sup>	995.9	681.6	8.2	13.8	292.3	825.0	170.9	107.1	216.4	439.0	233.4
<b>MONTHLY DATA</b>											
<b>Not Seasonally Adjusted</b>											
1999:											
January	962.2	650.7	8.1	18.7	284.6	790.9	171.3	96.0	194.5	427.9	243.7
February	971.3	655.0	7.5	17.8	291.1	803.0	168.3	97.9	191.9	437.9	243.7
March	991.4	673.0	7.9	15.6	294.8	820.8	170.6	99.1	194.6	452.9	244.9
April	1,013.1	690.6	8.5	15.3	298.7	839.4	173.6	99.3	203.1	461.6	249.2
May	1,031.5	710.8	8.9	15.1	296.7	853.6	177.9	99.2	209.3	466.7	256.4
June	1,038.1	722.0	9.1	14.5	292.6	856.0	182.2	102.0	216.1	466.3	253.8
July	1,053.6	737.4	8.6	14.1	293.5	869.6	184.0	105.6	220.3	469.7	258.0
August	1,061.5	743.2	8.2	14.9	295.2	877.6	183.9	108.8	221.7	467.7	263.4
September	1,053.2	735.6	8.1	15.5	294.0	871.3	181.9	108.1	221.8	465.3	258.0
October	1,051.6	733.9	9.0	14.8	293.9	870.5	181.0	109.8	227.9	462.4	251.4
November <sup>f</sup>	1,036.7	717.1	8.7	14.5	296.3	857.3	179.4	109.6	226.6	453.5	247.0
December <sup>f</sup>	995.9	681.6	8.2	13.8	292.3	825.0	170.9	107.1	216.4	439.0	233.4
2000:											
January <sup>p</sup>	992.0	674.5	8.4	13.7	295.4	821.7	170.3	105.4	209.6	443.0	234.0
<b>Seasonally Adjusted</b>											
1997: <sup>f</sup>											
January	817	573	29	215	(NA)	(NA)	89	177	352	199	
February	810	567	26	217	(NA)	(NA)	85	177	349	199	
March	808	562	28	218	(NA)	(NA)	81	178	347	202	
April	810	562	26	222	(NA)	(NA)	84	176	349	201	
May	816	564	25	227	(NA)	(NA)	83	180	350	203	
June	826	562	26	238	(NA)	(NA)	81	182	358	205	
July	836	568	26	242	(NA)	(NA)	83	184	363	206	
August	836	569	25	242	(NA)	(NA)	82	181	368	205	
September	846	574	26	246	(NA)	(NA)	84	182	370	210	
October	858	579	28	251	(NA)	(NA)	83	184	377	214	
November	865	578	30	257	(NA)	(NA)	87	182	378	218	
December	872	580	31	261	(NA)	(NA)	88	184	378	222	
1998: <sup>f</sup>											
January	886	592	33	261	(NA)	(NA)	90	188	383	225	
February	896	601	33	262	(NA)	(NA)	92	191	388	225	
March	905	611	33	261	(NA)	(NA)	94	188	394	229	
April	906	616	31	259	(NA)	(NA)	94	188	391	233	
May	912	624	31	257	(NA)	(NA)	96	187	394	235	
June	927	636	32	259	(NA)	(NA)	96	187	402	242	
July	938	642	33	263	(NA)	(NA)	99	184	409	246	
August	941	647	33	261	(NA)	(NA)	97	186	412	246	
September	952	654	31	267	(NA)	(NA)	97	190	416	249	
October	972	662	29	281	(NA)	(NA)	99	195	430	248	
November	976	671	30	275	(NA)	(NA)	99	196	436	245	
December	1,003	690	29	284	(NA)	(NA)	100	204	446	253	
1999: <sup>f</sup>											
January	1,008	693	28	287	(NA)	(NA)	100	205	448	255	
February	1,025	704	26	295	(NA)	(NA)	103	207	458	257	
March	1,029	707	24	298	(NA)	(NA)	103	208	464	254	
April	1,026	704	24	298	(NA)	(NA)	102	211	461	252	
May	1,026	706	25	295	(NA)	(NA)	101	211	459	255	
June	1,013	698	24	291	(NA)	(NA)	101	211	454	247	
July	1,017	702	23	292	(NA)	(NA)	102	212	454	249	
August	1,026	706	24	296	(NA)	(NA)	105	213	455	253	
September	1,021	702	24	295	(NA)	(NA)	105	213	455	248	
October	1,020	706	23	291	(NA)	(NA)	106	214	455	245	
November	1,022	708	21	293	(NA)	(NA)	106	218	453	245	
December	1,028	712	22	294	(NA)	(NA)	109	219	457	243	
2000:											
January <sup>p</sup>	1,041	720	23	298	(NA)	(NA)	110	221	464	246	
<b>AVERAGE RELATIVE STANDARD ERRORS<sup>2</sup></b>											
End of period . . . . . (percent) . . . . .	1	2	9	12	3	1	5	4	4	2	2

NA Not available. <sup>p</sup>Preliminary. <sup>f</sup>Revised.

<sup>1</sup>Metropolitan statistical areas.

<sup>2</sup>Average Relative Standard Errors: Average for the latest 6-month period (January through June or July through December).

Table 4. **New Privately Owned Housing Units Under Construction by Location and Type of Structure**

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

Period	United States			Inside MSAs <sup>1</sup>			Outside MSAs <sup>1</sup>			Northeast			Midwest			South			West			
	In structures with—		5 units or more	In structures with—		5 units or more	In structures with—		5 units or more	In structures with—		5 units or more	In structures with—		5 units or more	In structures with—		5 units or more	In structures with—		5 units or more	
	Total <sup>2</sup>	1 unit		Total <sup>2</sup>	1 unit		Total <sup>2</sup>	1 unit		Total <sup>2</sup>	1 unit		Total <sup>2</sup>	1 unit		Total <sup>2</sup>	1 unit		Total <sup>2</sup>	1 unit		Total <sup>2</sup>
<b>QUARTERLY DATA</b>																						
1991:	1st quarter . . . .	644.8	412.6	207.8	497.4	293.8	185.6	147.5	118.8	22.3	105.1	68.1	33.3	119.9	77.6	35.2	229.8	153.0	70.5	190.1	114.0	68.9
	2nd quarter . . . .	675.1	465.3	185.0	518.4	336.5	163.9	156.6	128.7	21.1	112.2	77.0	31.6	136.1	97.3	31.4	231.2	165.8	58.8	195.5	125.2	63.1
	3rd quarter . . . .	657.1	476.7	157.3	502.6	347.7	138.3	154.5	129.0	19.0	110.3	78.4	28.9	135.1	102.5	25.2	222.5	172.4	44.2	189.3	123.4	59.0
	4th quarter . . . .	606.3	433.5	149.2	458.4	314.3	127.1	147.9	119.2	22.1	103.9	72.6	28.4	122.4	90.5	25.1	208.5	158.3	42.7	171.6	112.1	53.0
1992:	1st quarter . . . .	622.9	451.8	148.7	471.6	330.2	125.5	151.3	121.6	23.2	96.8	66.6	27.2	127.3	95.2	25.6	226.0	173.7	45.4	172.8	116.4	50.4
	2nd quarter . . . .	667.6	504.8	140.5	501.9	366.7	119.2	165.7	138.1	21.3	95.4	72.0	20.7	150.1	113.5	29.9	242.6	193.4	42.4	179.5	125.9	47.4
	3rd quarter . . . .	664.0	511.5	132.2	491.6	364.5	112.3	172.5	147.0	19.9	91.7	70.2	19.1	155.5	116.9	32.5	239.1	196.0	37.6	177.8	128.5	43.0
	4th quarter . . . .	612.4	472.7	122.8	453.1	336.8	104.2	159.4	135.8	18.7	81.4	62.7	16.8	137.8	104.2	28.4	228.4	186.1	38.0	164.8	119.7	39.6
1993:	1st quarter . . . .	600.9	471.1	111.7	451.6	344.0	94.7	149.3	127.1	17.0	76.9	58.9	16.0	130.4	101.9	22.9	234.8	192.6	37.5	158.8	117.7	35.4
	2nd quarter . . . .	675.3	542.5	112.7	513.1	401.8	96.9	162.2	140.7	15.8	86.0	68.1	16.0	153.0	120.2	26.4	265.7	223.8	36.5	170.6	130.5	33.9
	3rd quarter . . . .	707.6	572.4	114.4	538.5	423.7	100.0	169.1	148.7	14.4	94.3	76.1	16.2	161.9	129.6	25.6	271.1	228.0	37.1	180.3	138.7	35.5
	4th quarter . . . .	680.1	543.0	118.2	521.0	404.7	102.9	159.1	138.3	15.3	89.3	72.5	14.8	154.4	119.0	29.2	265.4	219.1	40.9	170.9	132.4	33.3
1994:	1st quarter . . . .	695.6	551.1	126.8	542.5	418.6	111.5	153.0	132.5	15.3	84.9	65.9	17.0	148.5	116.1	27.1	286.5	231.5	49.4	175.6	137.7	33.3
	2nd quarter . . . .	776.8	608.9	150.5	605.0	459.4	132.8	171.7	149.4	17.7	96.8	77.5	17.4	176.3	139.4	31.5	316.9	245.9	65.7	186.7	146.0	36.0
	3rd quarter . . . .	806.0	621.2	164.7	625.5	464.3	146.7	180.5	156.8	17.9	96.6	77.8	16.7	185.0	144.0	34.5	330.3	250.6	74.0	194.1	148.7	39.4
	4th quarter . . . .	762.2	557.8	182.5	597.6	417.9	163.9	164.5	139.9	18.5	96.3	77.0	17.2	173.5	128.1	38.2	312.1	223.4	82.8	180.3	129.2	44.3
1995:	1st quarter . . . .	732.3	520.5	190.9	584.5	396.7	172.5	147.8	123.7	18.4	88.7	69.9	16.7	155.3	111.4	37.6	310.6	216.3	87.9	177.7	122.9	48.7
	2nd quarter . . . .	775.7	551.4	202.4	617.6	417.2	184.3	158.0	134.2	18.2	94.7	73.2	19.4	162.0	121.4	33.8	327.2	226.3	94.3	191.7	130.5	54.9
	3rd quarter . . . .	813.4	584.7	206.8	645.3	441.8	187.3	168.1	143.0	19.5	94.4	76.4	16.1	172.8	131.4	34.2	343.1	237.9	98.8	203.0	139.0	57.7
	4th quarter . . . .	775.9	547.2	207.7	620.1	417.0	187.4	155.8	130.2	20.3	86.3	70.1	14.3	172.0	125.0	40.2	331.4	226.7	98.5	186.3	125.3	54.8
1996:	1st quarter . . . .	772.8	544.0	209.9	620.5	417.2	189.2	152.3	126.8	20.7	82.6	66.8	13.8	164.5	121.0	37.3	335.7	231.4	98.5	190.0	124.8	60.2
	2nd quarter . . . .	845.1	610.5	208.0	672.9	465.2	188.1	172.2	145.3	19.8	90.4	74.2	13.5	183.6	141.5	32.9	363.2	257.9	97.6	208.0	136.9	64.1
	3rd quarter . . . .	858.9	624.5	209.1	680.0	473.2	188.3	178.9	151.3	20.9	93.7	76.7	14.3	193.4	150.3	34.1	364.4	259.2	98.2	207.5	138.3	62.5
	4th quarter . . . .	792.3	550.0	214.3	629.9	417.2	191.6	162.4	132.9	22.7	85.2	68.1	14.0	178.0	128.7	39.4	337.6	230.3	99.5	191.4	122.9	61.3
1997:	1st quarter . . . .	772.9	530.7	216.0	625.5	411.5	194.2	147.4	119.2	21.8	77.8	60.2	14.6	164.9	119.5	36.2	336.6	223.4	105.9	193.6	127.6	59.3
	2nd quarter . . . .	845.0	579.7	239.3	680.0	446.0	214.6	165.0	133.8	24.7	82.2	63.1	16.2	185.5	134.9	41.6	367.1	242.4	116.9	210.1	139.3	64.6
	3rd quarter . . . .	877.0	605.2	245.5	703.0	461.8	221.5	174.0	143.3	24.0	86.7	65.7	18.0	190.9	143.9	37.9	380.4	248.7	123.7	219.0	146.9	65.8
	4th quarter . . . .	846.7	554.6	260.2	683.5	426.5	235.1	163.2	128.1	25.1	87.1	63.1	20.7	181.9	126.9	42.0	364.8	226.4	129.4	213.0	138.2	68.0
1998:	1st quarter . . . .	867.6	578.6	258.4	710.2	452.7	234.5	157.5	125.8	23.9	89.7	63.7	22.6	174.9	124.8	40.0	383.4	245.4	127.7	219.7	144.7	68.1
	2nd quarter . . . .	948.7	656.4	260.0	770.0	507.7	237.5	178.7	148.7	22.5	96.8	71.3	21.8	191.0	145.4	35.4	412.4	275.5	126.0	248.3	164.2	76.8
	3rd quarter . . . .	984.7	686.8	266.7	798.0	528.0	245.5	186.7	158.8	21.2	100.1	73.2	23.1	197.9	155.4	32.8	427.1	286.1	130.1	259.7	172.2	80.6
	4th quarter . . . .	970.8	659.1	282.9	794.8	510.8	261.2	176.0	148.4	21.7	98.5	70.2	24.8	201.2	152.3	39.6	428.5	278.8	140.2	242.6	157.9	78.3
1999:	1st quarter . . . .	991.4	673.0	294.8	820.8	528.0	274.0	170.6	145.0	20.8	99.1	71.2	24.7	194.6	149.7	37.3	452.9	293.6	151.8	244.9	158.6	81.0
	2nd quarter . . . .	1,038.1	722.0	292.6	856.0	565.2	272.2	182.2	156.8	20.4	102.0	76.0	22.7	216.1	166.5	42.1	466.3	307.7	150.9	253.8	171.7	76.9
	3rd quarter . . . .	1,053.2	735.6	294.0	871.3	579.0	274.1	181.9	156.5	19.9	108.1	79.7	25.1	221.8	172.7	41.1	465.3	307.2	150.5	258.0	176.0	77.2
	4th quarter . . . .	995.9	681.6	292.3	825.0	535.4	272.6	170.9	146.2	19.7	107.1	80.7	23.3	216.4	162.4	46.6	439.0	284.8	147.1	233.4	153.7	75.3
<b>AVERAGE RELATIVE STANDARD ERRORS<sup>3</sup></b>																						
End of period (.percent) . . . .		1	2	3	1	1	3	5	6	11	3	3	11	4	5	8	2	2	4	2	3	2

<sup>P</sup>Preliminary. <sup>R</sup>Revised.

<sup>1</sup>Metropolitan statistical areas.

<sup>2</sup>Includes units under construction in structures with two to four units.

<sup>3</sup>Average Relative Standard Errors: Average for the latest 2-quarter period (quarter 1 through quarter 2 or quarter 3 through quarter 4).

# Appendix A.

---

## DEFINITIONS

One-unit structures are defined as completed when all finish flooring has been installed (or carpeting, if used in place of finish flooring). If the building is occupied before all construction is finished, it is classified as completed at the time of occupancy. In buildings with two or more housing units, all the units in the building are counted as completed when 50 percent or more of the units are occupied or available for occupancy. All units in a residential building are counted as started when excavation is started for the footings or foundations of the building. Beginning with statistics for September 1992, estimates of housing starts include units in residential structures being totally rebuilt on an existing foundation. Housing units are counted as under construction between start and completion, as defined above.

A housing unit is a single room or group of rooms intended for occupancy as separate living quarters by a family, by a group of unrelated persons living together, or by a person living alone. Separate living quarters are those in which the occupants do not live with any other persons in the structure and which have direct access from the outside of the building or through a common hall which is used or intended to be used by the occupants of another unit or by the general public.

A housekeeping residential building is one consisting primarily of housing units. New housing units exclude group quarters (such as dormitories and rooming houses), transient accommodations (such as transient hotels, motels, and tourist courts), HUD-coded manufactured houses (trailers), moved or relocated buildings, and housing units created in an existing residential or nonresidential structure. However, in a building combining substantial residential and nonresidential floor areas, every effort is made to include the residential units in these statistics, even though the primary function of the entire building is for nonresidential purposes.

Housing units, as distinguished from HUD-coded manufactured homes, include conventional “stick-built” units, prefabricated, panelized, components, sectional, and modular units.

The standard census geographic regions are used in the tables of this report. States contained in each region are as follows: **Northeast** — Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania; **Midwest** — Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas;

**South** — Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas; **West** — Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, and Hawaii.

The distribution of housing completions between units inside and outside metropolitan statistical areas (MSAs) is based on definitions published by the Office of Management and Budget in *Metropolitan Statistical Areas*. Data for the period beginning January 1994 are based on the 1992 definitions, as amended June 1993; data for the period January-December 1993 are based on the 1992 definitions; data for January 1984-December 1992 are based on the 1974 definitions, as amended June 1983; data for January 1976-December 1983 are based on the 1974 definitions, as amended August 1975; data for January 1975-December 1975 are based on the 1967 definitions, as amended April 1974; data for January 1974-December 1974 are based on the 1967 definitions, as amended November 1973; data for April 1973-December 1973 are based on the 1967 definitions, as amended February 1973; data for April 1968-March 1973 are based on the 1967 definitions.

## SAMPLE DESIGN AND SELECTION

The sample design for the Survey of Construction (SOC) is a stratified multistage cluster design derived from the Current Population Survey (CPS), 1980 design. Each state was divided into areas made up of counties (towns in New England) and independent cities. These areas were grouped within each state to form strata for the CPS according to metropolitan status and the 1980 labor force, race/ethnic origin, population change, and family and housing characteristics. One area from each of the strata was selected with probability proportional to the number of persons 16 years of age and older. The CPS strata were further stratified into 169 strata according to Census region, metropolitan status, building permit activity in 1982, population, and the percent of the population in areas which do not issue permits. One of the CPS selected areas was chosen from each of these 169 strata with probability proportional to the number of persons 16 and older. Within each of these 169 areas, the sample was selected from two different sample frames: permit-issuing places and land areas not covered by building permit systems.

Each of the 17,000 permit-issuing places was assigned to one of six size classes based on a weighted average of 1978, 1981, and 1982 permit activity. The permit places in each of the 169 areas were grouped into these six size classes and a systematic sample of places was selected from each one of them. Places were selected at different sampling rates in each of the classes so that larger proportions of the places were selected from the larger size classes. For example, all places in the largest size classes fell into sample if they were in the 169 areas, whereas, only an expected 1 in 40 of the places in the smallest size class fell into sample. Approximately 840 permit-issuing places were selected.

Monthly, census field representatives now sample permits from about 820 of these permit-issuing places. They select permits for one-to-four-unit buildings with probability proportional to the number of units at an overall rate of 1 in 40. All permits for buildings with five units or more are selected.

Within each of the 169 areas, the land not covered by building permit systems, called nonpermit areas, was identified. Small land areas (1980 Census enumeration districts) in these nonpermit areas were grouped into two strata according to the 1980 population. Overall, 1 out of every 120 land areas was selected from the strata with the larger areas and 1 out of 600 was selected from the strata with the smaller areas. Monthly, census field representatives intensively canvassed about 130 selected land areas looking for all housing units started.

In January 1995, the area covered by building permit systems was expanded to 19,000 permit-issuing places. Canvassing was stopped in those selected land areas now represented by permit-issuing places. Census field representatives continue to canvass monthly about 70 land areas still not covered by building permit systems.

## **HOUSING COMPLETIONS AND UNDER CONSTRUCTION COMPILATION**

The housing completions and under construction series is a product of the housing starts survey and the compilation is basically the same as that used for housing starts.

1. An estimate is made monthly of the number of housing units for which building permits have been issued in all 19,000 permit-issuing places. The estimate of building permit authorizations is based on a sample of 8,600 of these 19,000 jurisdictions.
2. For each permit selected in the 820 permit-issuing places, inquiries are made of the owners or builders of units that are under construction to determine if these units have been completed. For those units not completed, inquiries are made in successive months to determine when they are completed. Ratios are then calculated (by type of structure) of the number of units completed and under construction to the number of units covered by permits. Separate ratios are

calculated for units authorized from permits of that month and each preceding month. These ratios are then applied to the appropriate estimate of the number of units authorized by permits in the corresponding months to provide estimates of the total number of units completed and under construction for each month of authorization.

3. Having produced estimates of the number of units completed and under construction with permit authorization, an upward adjustment of 3.3 percent is made to the number of one-unit structures (single-family houses) to account for those units built within permit-issuing areas but without permit authorization. A study spanning a four-year period indicated that permits were obtained for all buildings with two housing units or more. For housing completions, upward adjustments are also made to account for late reports.
4. The total estimates of housing completions and under construction include estimates of the number of units completed and under construction in areas where building permit systems do not exist. All buildings within the sampled nonpermit areas are followed up for completion information provided by the owners, builders, or site inspection and weighted appropriately.

## **HOUSING COMPLETIONS AND UNDER CONSTRUCTION BY TYPE OF STRUCTURE**

A total of 14 different sets of rates that change from month-to-month are utilized to calculate the number of housing units completed and under construction (by type of structure) in permit places. Eight sets of rates are used for one-unit structures: separate sets of rates for metropolitan and nonmetropolitan areas within each of the four regions. For structures with five units or more, separate sets of rates are used for each of the four regions. Single sets of rates are used for all regions for structures with two units and for structures with three and four units.

Housing completions and under construction estimates by type of structure in nonpermit areas are calculated directly in the estimating procedure described above. However, virtually all housing units now being completed in nonpermit areas are one-unit structures.

## **RELIABILITY OF DATA**

The various estimates of privately owned housing units completed and under construction which are shown in this publication are based on sample surveys and may differ from statistics which would have been obtained from a complete census using the same schedules and procedures. An estimate based on a sample survey is subject to both sampling error and nonsampling error. The accuracy of a survey result is determined by the joint effects of these errors.



---

## Measures of Sampling Errors

Sampling error reflects the fact that only a particular sample was surveyed rather than the entire population. Each sample selected for this survey is one of a large number of similar probability samples that, by chance, might have been selected under the same specifications. Estimates derived from the different samples would differ from each other. The standard error, or sampling error, of a survey estimate is a measure of the variation among the estimates from all possible samples and, thus, is a measure of the precision with which an estimate from a particular sample approximates the average from all possible samples.

Estimates of the standard errors have been computed from the sample data for selected statistics in this report. They are presented in the tables in the form of average relative standard errors. The relative standard error equals the standard error divided by the estimated value to which it refers.

The sample estimate and an estimate of its standard error allow us to construct interval estimates with prescribed confidence that the interval includes the average result of all possible samples with the same size and design. For example, suppose Table 1 of this report showed that an estimated 110,000 units in one-unit structures were completed in a particular month. Further, suppose that the average relative standard error of this estimate is 3 percent. Multiplying 110,000 by 0.03, we obtain 3,300 as the standard error. This means that we are confident, with 2 chances out of 3 of being correct, that the average estimate from all possible samples of one-unit structures completed during the particular month is between 113,300 and 106,700 units. To increase the probability to about 9 chances out of 10 that the interval contains the average value over all possible samples (this is called a 90-percent confidence interval), multiply 3,300 by 1.6 yielding limits of 115,280 and 104,720 (110,000 units plus or minus 5,280 units). The average estimate of one-unit structures completed during the specified month may or may not be contained in any one of these computed intervals, but for a particular sample one can say that the average estimate from all possible samples is included in the constructed interval with a specified confidence of 90 percent.

Ranges of 90-percent confidence intervals for estimated percent changes are shown in the text. When the range of the confidence interval contains zero, it is unclear whether there was an increase or decrease; that is, the change is not statistically significant.

## Nonsampling Errors

As calculated for this report, the coefficient of variation estimates sampling variation but does not measure all nonsampling error in the data. Nonsampling error consists of both a variance component and a bias component. Bias

is the difference, averaged over all possible samples of the same size and design, between the estimate and the true value being estimated. Nonsampling errors are usually attributed to many possible sources: (1) coverage error - failure to accurately represent all population units in the sample, (2) inability to obtain information about all sample cases, (3) response errors, possibly due to definitional difficulties or misreporting, (4) mistakes in recording or coding the data obtained, and (5) other errors of coverage, collection and nonresponse, response, processing, or imputing for missing or inconsistent data. These nonsampling errors also occur in complete censuses. Although no direct measures of these errors have been obtained, precautionary steps were taken in all phases of the collection, processing, and tabulation of the data to minimize their influence.

As described in the section, "Housing Completions and Under Construction Compilation," a potential source of bias is the upward adjustment of 3.3 percent made to account for one-unit structures completed and under construction in permit-issuing areas without permit authorization. Another source is the adjustment for late-reported completions. The final estimates of housing units completed are adjusted by about 1 percent.

## SEASONAL ADJUSTMENT

Seasonal adjustment is the process of estimating and removing seasonal effects from a time series to better reveal certain non-seasonal features such as underlying trends and business cycles. Seasonal adjustment procedures estimate effects that occur in the same calendar month with similar magnitude and direction from year-to-year. In series whose seasonal effects come primarily from weather the seasonal factors are estimates of average weather effects for each month. It does not account for abnormal weather conditions or for year-to-year changes in weather. Seasonal factors are estimates based on present and past experience. Future data may show a different pattern.

The mechanics of seasonal adjustment involve breaking down a time series into trend-cycle, seasonal and irregular components.

**Trend cycle.** The long-term tendencies of a series to grow or decline.

**Seasonal effects.** Effects that are reasonably stable in terms of timing, direction and magnitude. Possible causes include natural factors (the weather), administrative measures and social/cultural/religious traditions.

**Irregular component.** Anything not included in the trend-cycle or the seasonal effects (including trading-day or holiday effects). Its values are unpredictable as regards timing, impact, and duration. It can arise from sampling error, nonsampling error, unseasonable weather, natural disasters, strikes, etc.

---

Monthly time series that are totals of daily activities can be influenced by each calendar month's weekday composition. This influence is revealed when monthly values consistently depend on which days of the week occur five times in the month. For example, building permit offices are usually closed on Saturday and Sunday. Thus, the number of building permits issued in a given month is likely to be higher if the month contains a surplus of weekdays and lower if the month contains a surplus of weekend days. Recurring effects associated with individual days of the week are called trading-day effects.

Trading-day effects can make it difficult to compare time series values or to compare movements in one series with movements in another. For this reason, when estimates of trading-day effects are statistically significant, we adjust them out of the series. The removal of such estimates is referred to as trading day adjustment.

Most of the seasonally adjusted series in this report are shown as seasonally adjusted annual rates (SAAR). The seasonally adjusted annual rate is the seasonally adjusted monthly value multiplied by 12. The benefit of the annual rate is that not only can we compare one monthly estimate with another, we can also compare monthly data to an annual total.

The seasonal adjustment indexes shown in this publication were developed using X-12-ARIMA. The X-12-ARIMA is a seasonal adjustment program developed at the U.S. Census Bureau. The program is based on the Bureau's earlier X-11 program and the X-11-ARIMA/88 program developed at Statistics Canada. For more information on X-12-ARIMA please see the X-12 website ([www.census.gov/pub/ts](http://www.census.gov/pub/ts)).

## **COMPLETIONS AND UNDER CONSTRUCTION**

Seasonal indexes are developed each month (concurrent adjustment) for total private housing completions and under construction, by region and type of structure. Every month, each series is run through the X-12-ARIMA program. The seasonally adjusted U.S. total is the sum of six seasonally adjusted components: single-family structures in each of the four regions, U.S. total for two-to four unit structures, and U.S. total for structures with five units or more. Also, the unadjusted data for the four regions are seasonally adjusted and modified so that the seasonally adjusted U.S. total derived from the regions equals the seasonally adjusted U.S. total derived from the structures. Note the seasonal factors for private housing completions shown in Table A-1 and for housing under construction in Table A-2 are the product of trading-day and seasonal factors. For simplicity we refer to the product factors as seasonal factors.

## **CENSUS BUREAU CONSTRUCTION REPORTS AND RELATED PUBLICATIONS**

Current Construction Reports, Series C20: *Housing Starts* (monthly).

Current Construction Reports, Series C25: *New One-Family Houses Sold and For Sale* (monthly).

Current Construction Reports, Series C30: *Value of New Construction Put in Place* (monthly).

Current Construction Reports, Series C50: *Expenditures for Residential Improvements and Repairs* (quarterly).

Table A-1. Seasonal Indexes Used to Adjust Housing Units Completed

Period	United States implicit index <sup>1</sup>	In structures with—						All units			
		1 unit				2 to 4 units	5 units or more	North-east	Midwest	South	West
		North-east	Midwest	South	West						
<b>1997<sup>r</sup></b>											
January	83.4	86.4	81.0	83.4	87.2	81.0	81.2	84.8	79.7	85.2	86.3
February	81.4	82.2	72.7	84.4	83.4	90.6	78.9	81.0	73.4	83.9	84.4
March	91.0	81.5	80.0	98.8	91.3	109.8	87.1	79.6	81.0	95.2	91.0
April	92.4	84.7	90.2	93.3	93.9	98.8	93.3	88.2	93.0	93.7	93.1
May	97.4	95.6	94.4	97.9	98.2	96.6	99.1	102.7	96.2	98.6	97.6
June	103.9	103.9	105.0	102.1	103.5	98.0	109.4	101.0	106.6	103.4	102.6
July	103.1	98.3	101.9	102.0	100.7	99.3	112.6	102.5	100.5	101.6	104.0
August	109.2	106.8	107.8	105.5	107.3	106.9	121.5	103.8	114.6	109.4	107.8
September	107.6	110.9	114.8	104.8	107.9	103.9	105.4	113.9	116.5	102.3	105.2
October	110.7	117.6	120.4	108.2	109.2	108.9	106.0	112.5	115.6	108.9	110.6
November	104.3	112.8	115.7	103.3	102.7	101.7	94.3	110.5	109.2	101.9	101.6
December	114.7	118.5	115.6	117.1	114.6	103.5	110.6	118.6	113.0	115.4	115.8
<b>1998<sup>r</sup></b>											
January	83.4	87.0	81.6	82.4	87.1	80.8	81.5	85.1	80.2	85.2	86.0
February	81.4	81.8	72.3	85.7	83.7	87.7	78.7	80.7	73.3	84.1	84.6
March	90.4	82.0	80.4	97.6	91.5	116.2	87.5	80.7	81.4	95.4	91.4
April	92.3	84.6	90.5	92.9	93.6	98.6	93.5	87.7	93.2	94.0	93.0
May	97.4	95.7	94.5	97.3	97.9	96.6	100.1	103.4	96.2	98.4	97.3
June	104.5	104.4	104.7	103.1	103.6	97.6	108.6	101.6	106.1	103.3	102.9
July	103.3	98.2	102.1	102.0	100.3	98.0	112.8	102.6	101.1	101.7	103.8
August	109.4	106.4	107.5	105.6	107.7	105.9	121.3	103.2	114.8	109.7	107.7
September	108.2	111.8	114.7	105.9	108.6	104.6	105.3	114.1	116.5	102.6	105.4
October	110.2	117.4	120.1	106.8	108.8	108.8	105.8	111.2	114.8	108.2	110.6
November	104.0	111.9	116.0	104.0	102.8	102.1	93.6	109.9	109.3	102.2	101.6
December	114.4	118.2	115.4	116.4	113.9	104.0	110.0	118.7	112.4	115.0	115.1
<b>1999<sup>r</sup></b>											
January	83.3	87.3	82.0	82.2	87.2	80.5	82.2	85.2	80.4	84.9	86.0
February	81.8	81.7	71.9	86.3	84.0	84.0	79.0	80.8	73.3	84.3	85.0
March	91.0	82.2	80.5	97.5	91.8	118.8	88.1	81.2	81.8	95.4	91.8
April	92.0	84.5	90.7	92.4	93.2	99.2	93.7	87.6	93.1	94.1	92.7
May	97.2	96.0	94.4	97.2	97.8	97.2	100.3	104.0	96.4	98.1	97.0
June	104.9	104.8	104.8	104.4	103.8	97.0	108.4	102.4	105.7	103.6	103.4
July	102.9	98.1	102.6	101.1	99.8	97.1	112.7	102.5	101.6	101.9	103.5
August	109.4	106.0	107.2	105.9	107.7	105.9	121.5	102.7	115.1	110.0	107.8
September	108.5	112.2	114.6	106.6	109.2	105.3	105.0	113.6	116.4	103.6	105.9
October	109.9	117.1	119.8	107.1	109.2	109.1	104.9	110.4	114.2	107.4	110.4
November	104.5	111.8	116.3	103.7	102.6	102.0	93.3	110.4	109.7	102.0	101.2
December	114.0	118.0	115.2	115.1	113.8	104.8	109.5	118.6	112.1	114.0	115.0
<b>2000<sup>p</sup></b>											
January	83.7	87.1	82.0	82.7	87.1	80.7	82.7	84.9	80.4	84.6	86.0

<sup>p</sup>Preliminary. <sup>r</sup>Revised.

<sup>1</sup>The implicit seasonal index is the ratio of the unadjusted number of housing units completed in the United States to the seasonally adjusted national total of housing units completed. It provides an indication of the overall seasonality for the particular month.

Note: These seasonal indexes include trading-day adjustment factors.

Table A-2. Seasonal Indexes Used to Adjust Housing Units Under Construction

Period	United States implicit index <sup>1</sup>	In structures with—						All units			
		1 unit				2 to 4 units	5 units or more	North-east	Midwest	South	West
		North-east	Midwest	South	West						
<b>1997<sup>r</sup></b>											
January	95.1	95.5	92.6	93.8	93.7	98.8	99.0	95.6	94.6	95.6	95.4
February	94.3	92.4	89.4	94.1	92.8	96.4	98.4	94.0	92.1	95.7	94.8
March	95.7	92.0	91.3	96.5	95.4	95.8	98.9	95.0	92.9	97.2	96.1
April	98.7	96.7	95.1	99.4	98.8	96.5	100.4	97.7	95.8	99.8	98.8
May	100.5	99.0	99.3	102.0	100.2	97.9	100.6	98.6	99.4	101.8	100.8
June	102.3	101.2	103.1	103.6	102.9	101.6	100.5	100.9	101.9	102.6	102.5
July	103.5	105.1	106.0	104.2	105.0	99.2	100.4	103.5	104.0	103.5	103.4
August	104.0	106.4	107.3	104.4	106.0	101.4	99.8	104.5	104.2	102.9	104.1
September	103.7	104.3	107.8	103.9	105.6	101.8	99.7	103.5	104.5	102.6	104.2
October	103.3	104.6	106.9	102.4	104.4	103.5	101.2	104.1	106.7	101.8	103.2
November	101.5	103.4	103.6	100.2	100.5	104.9	101.1	103.3	104.0	100.0	100.6
December	97.1	99.3	96.5	95.1	94.7	102.1	99.8	98.8	99.0	96.2	95.9
<b>1998<sup>r</sup></b>											
January	95.5	95.6	92.9	93.9	93.6	99.2	99.0	95.8	95.1	95.8	95.5
February	94.6	92.6	90.0	94.2	92.8	96.6	98.6	94.5	92.4	95.9	94.8
March	95.9	92.3	91.8	96.6	95.3	95.5	99.0	95.3	93.2	97.2	96.0
April	98.8	96.3	95.6	99.5	98.7	96.5	100.4	97.7	96.4	100.0	98.8
May	100.7	99.1	99.4	102.2	100.4	98.0	100.5	98.6	99.2	101.7	100.9
June	102.3	101.3	103.3	103.6	103.1	101.1	100.4	100.5	102.1	102.6	102.6
July	103.4	105.0	105.8	104.3	105.3	99.6	100.3	103.4	103.9	103.5	103.5
August	103.8	105.6	106.7	104.3	106.0	101.3	99.8	104.3	103.8	102.8	104.1
September	103.4	105.1	107.1	103.6	105.5	101.5	99.7	103.3	104.1	102.4	104.1
October	103.3	104.7	106.6	102.4	104.2	103.7	101.1	104.1	106.6	101.8	103.1
November	101.2	102.8	103.4	100.1	100.4	104.8	101.2	103.2	103.8	100.0	100.6
December	96.8	98.9	96.6	94.9	94.6	101.7	99.7	98.8	98.9	96.1	95.9
<b>1999<sup>r</sup></b>											
January	95.5	95.6	93.1	94.0	93.5	99.4	99.1	96.1	95.2	95.8	95.5
February	94.8	92.8	90.6	94.3	92.8	96.9	98.7	94.9	92.5	96.0	94.9
March	96.3	93.1	92.3	96.8	95.3	95.3	99.1	95.5	93.2	97.2	96.0
April	98.7	96.2	95.8	99.6	98.6	96.7	100.3	97.6	96.5	100.2	98.8
May	100.5	98.4	99.5	102.3	100.5	98.2	100.5	98.6	99.3	101.8	100.9
June	102.5	102.0	103.4	103.7	103.2	100.6	100.4	100.4	102.3	102.6	102.6
July	103.6	105.0	105.5	104.3	105.6	100.0	100.4	103.2	103.9	103.4	103.5
August	103.5	105.8	106.2	104.2	106.1	101.6	99.6	104.1	103.9	102.7	104.1
September	103.2	104.7	106.5	103.3	105.4	101.3	99.7	103.1	104.0	102.1	104.0
October	103.1	104.7	106.4	102.3	103.9	103.5	101.1	104.1	106.4	101.8	103.0
November	101.4	103.0	103.3	100.1	100.4	104.9	101.3	103.2	103.9	100.0	100.6
December	96.9	98.9	96.8	94.8	94.6	101.3	99.6	99.0	98.9	96.0	95.9
<b>2000<sup>p</sup></b>											
January	95.3	95.0	93.2	94.0	93.4	99.3	99.0	96.3	95.1	95.8	95.5

<sup>p</sup>Preliminary. <sup>r</sup>Revised.

<sup>1</sup>The implicit seasonal index is the ratio of the unadjusted number of housing units under construction in the United States to the seasonally adjusted national total of housing units under construction. It provides an indication of the overall seasonality for the particular month.

Note: These seasonal indexes include trading-day adjustment factors.

Table A-3. Average Percent Changes and Related Measures for Monthly Private Housing Units Completed and Under Construction

Series	Average percentage change				Ratio of irregular components to cyclical component (I/C)	F-test for stable seasonality (F)	M7	Indicator of seasonal adjustment quality (Q)
	Original series (O)	Seasonally adjusted series (CI)	Irregular component (I)	Cyclical component (C)				
<b>PRIVATE HOUSING COMPLETIONS</b>								
U.S. total .....	9.10	5.03	4.91	0.84	5.83	101.82	0.22	0.57
Northeast .....	16.07	12.91	12.88	1.64	7.83	20.33	0.48	1.16
Midwest .....	13.01	9.22	9.16	0.90	10.22	74.73	0.28	1.05
South .....	10.11	6.13	6.09	0.79	7.71	41.58	0.35	0.75
West .....	11.84	8.20	8.09	0.88	9.19	27.03	0.43	1.00
1 unit								
Northeast .....	15.28	11.30	11.23	1.41	7.97	30.19	0.38	1.08
Midwest .....	12.09	7.48	7.50	0.96	7.78	118.18	0.22	0.67
South .....	9.91	5.12	5.08	0.72	7.10	50.24	0.30	0.72
West .....	11.12	7.85	7.83	0.90	8.72	29.90	0.37	0.89
2 to 4 units .....	23.82	20.66	20.74	2.21	9.38	5.88	0.92	1.47
5 units or more .....	15.24	11.76	11.61	1.62	7.16	18.38	0.55	0.97
<b>UNITS UNDER CONSTRUCTION</b>								
U.S. total .....	1.91	0.84	0.44	0.70	0.63	547.85	0.14	0.19
Northeast .....	2.59	1.69	1.03	1.32	0.78	163.37	0.18	0.21
Midwest .....	3.31	1.35	0.93	0.87	1.07	189.69	0.31	0.27
South .....	1.93	1.21	0.72	0.95	0.76	254.22	0.14	0.17
West .....	2.00	1.25	0.90	0.81	1.11	289.24	0.12	0.12
1 unit								
Northeast .....	2.92	1.76	0.98	1.35	0.73	374.68	0.11	0.18
Midwest .....	4.13	1.40	0.91	0.90	1.01	255.05	0.35	0.20
South .....	2.33	1.24	0.80	0.83	0.97	385.19	0.14	0.11
West .....	2.59	1.38	0.96	0.88	1.10	282.71	0.12	0.13
2 to 4 units .....	3.29	2.90	2.20	1.72	1.28	17.88	0.53	0.51
5 units or more .....	1.94	1.83	1.09	1.44	0.75	18.73	0.61	0.40

**Definitions of Summary Measures**

The following are brief descriptions of the measures shown here:

**O** is the average month-to-month percentage change, without regard to sign, in the original series.

**CI** is the average month-to-month percentage change, without regard to sign, in the seasonally adjusted series.

**I** is the average month-to-month percentage change, without regard to sign, for the irregular component, which is obtained by dividing the cyclical component into the seasonally adjusted series.

**C** is the average month-to-month percentage change, without regard to sign, in the cyclical component. C is a smooth, flexible moving average of the seasonally adjusted series.

**I/C** is the average month-to-month percentage change, without regard to sign, of the irregular component divided by the average month-to-month percentage change, without regard to sign, of the cyclical component. This is an indication of the series' relative smoothness (small values) or irregularity (large values).

**F** is an F-test value measuring the presence of stable seasonality. It is the quotient of two variances: (1) the between months variance and (2) the residual variance, which is mainly due to the irregular component. Higher F values may indicate the presence of stable seasonality. Lower values may indicate a lack of stable seasonality.

**M7** is a function of the F-test assessing the significance of stable seasonality and the F-test assessing the significance of moving seasonality. It may range from 0 to 3 with an acceptance range from 0 to 1.

**Q** is a weighted average of M1-M11 (quality monitoring statistics from X-12 -ARIMA). It is an indicator of the overall quality of the adjustment with an acceptance range of 0 to 1. Values from 1.0 to 1.2 may be accepted if other diagnostics indicate suitable adjustment quality.

# Monthly Revisions To Estimates

Each month the Census Bureau publishes preliminary estimates of Housing Completions. The Census Bureau releases these estimates to provide government and private data users with early measures of new privately owned residential construction activity. A necessary part of the process of issuing these early data involves the issuance of subsequent revisions. The revisions to monthly housing completions are primarily the result of the replacement of imputed data with data which are reported in subsequent months.

For total housing completions, the range of the difference between the last 12 preliminary and first revision estimates for the same months was from -1.46 percent to 2.56 percent, with a median of -0.88 percent. The range of the difference between preliminary and final estimates was from -1.33 percent to 2.27 percent, with a median of -0.48 percent.

## Analysis of Revisions to Monthly Seasonally Adjusted Estimates of Housing Completions

Series	Percent changes between estimates— last 12 months					
	First revision versus preliminary			Final versus preliminary		
	Range		Median	Range		Median
	From	To		From	To	
<b>HOUSING COMPLETIONS</b>						
<b>U. S. total</b> .....	<b>-1.46</b>	<b>2.56</b>	<b>-0.88</b>	<b>-1.33</b>	<b>2.27</b>	<b>-0.48</b>
In structures with-						
1 unit .....	-2.34	1.41	-1.01	-1.68	2.99	-0.87
2 to 4 units .....	-4.17	13.21	0.00	-9.68	7.69	0.00
5 units or more .....	-2.02	8.97	0.18	-1.29	7.26	0.68
Northeast .....	-4.97	3.10	1.56	-4.42	10.85	0.73
Midwest .....	-6.53	4.98	-0.44	-3.75	5.06	-0.46
South .....	-2.44	2.10	0.00	-1.67	2.26	0.33
West .....	-5.27	2.26	-0.84	-5.90	4.27	-0.58