

TABLE S8-13

USPTO patents and patent families granted in optics, by region, country, or economy: 1998–2018

(Number)

Region, country, or economy	1998		1999		2000		2001		2002		2003		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018	
	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families		
World	7,796	11,995	7,374	12,977	7,414	10,510	7,706	9,954	7,937	10,368	8,725	11,375	9,281	11,535	8,095	11,920	9,286	14,247	8,388	16,315	8,573	15,589	8,787	15,054	10,506	17,029	10,378	19,479	10,470	21,188	11,018	21,438	11,891	19,871	11,969	15,340	11,692	17,282	11,575	17,028	10,989	16,002
North America	2,826	2,199	2,814	2,122	2,746	1,993	2,986	2,026	3,140	1,978	3,480	2,155	3,114	1,588	3,304	2,048	3,114	1,648	2,862	1,463	2,703	1,340	2,568	1,240	2,923	1,361	2,594	1,137	2,641	1,100	2,736	1,055	2,894	1,063	2,922	950	3,002	883	2,791	789		
Canada	102	81	78	72	92	67	90	62	107	75	136	96	125	69	104	57	111	51	100	72	104	76	109	75	131	81	125	75	129	72	120	70	142	83	127	72	139	68	154	71	136	43
Mexico	0	0	2	1	0	0	1	1	4	3	2	2	1	2	2	2	1	1	2	2	1	0	1	0	0	1	0	4	2	3	1	5	1	5	1	6	7	6	1			
Puerto Rico	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
United States	2,724	2,117	2,734	2,049	2,653	1,925	2,894	1,962	3,029	1,901	3,342	2,057	3,401	1,977	3,008	1,529	3,192	1,595	2,760	1,389	2,599	1,263	2,458	1,164	2,792	1,280	2,468	1,062	2,508	1,026	2,613	984	2,747	980	2,733	913	2,777	876	2,840	804	2,649	745
All others	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Central and South America	1	1	2	2	2	2	3	1	2	4	1	2	3	1	2	1	3	1	0	1	1	1	3	1	3	1	0	4	3	4	3	5	3	4	3	5	6	5	5	15		
Argentina	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Brazil	0	0	1	0	2	2	2	1	3	1	0	3	0	0	2	0	1	1	0	1	1	1	2	2	1	3	0	3	2	3	3	2	4	3	2	4	3	4	3	13		
All others	0	0	2	2	0	0	0	1	1	1	1	0	1	0	1	0	0	0	0	0	0	1	0	0	1	0	1	0	1	3	1	1	3	0	2	0	1	2	4	2		
Europe	780	948	719	868	791	788	851	732	817	850	927	1,021	991	1,086	806	944	959	1,008	824	941	915	973	817	915	932	881	860	806	887	792	1,032	768	1,106	758	1,103	840	1,090	856	1,242	1,017	1,097	1,013
EU	740	708	670	728	747	638	798	583	765	696	870	833	914	840	743	751	901	812	784	744	866	746	775	652	876	678	813	626	847	624	966	580	1,043	570	1,033	605	1,021	674	1,169	785	1,033	791
Austria	6	8	8	9	13	22	13	10	10	12	10	11	9	11	13	11	13	20	8	14	8	12	6	13	14	17	16	14	13	19	16	11	16	17	16	19	15	19	14	23	23	
Belgium	92	24	77	33	83	25	61	20	43	21	41	27	31	18	20	10	29	10	20	8	20	14	14	24	13	18	22	10	13	22	30	19	38	12	44	25	45	6				
Denmark	5	2	4	1	4	1	8	1	6	2	12	12	6	3	11	4	6	3	13	3	9	5	13	6	13	9	2	6	10	3	2	15	1	4	15	4	9	6				
Finland	2	7	5	3	3	9	8	3	3	5	5	8	5	13	11	17	9	14	15	9	13	13	14	21	17	9	7	11	5	12	3	12	5	18	14	19	12	24	19			
France	118	201	99	193	110	122	120	130	90	169	127	260	114	217	80	161	79	187	64	156	58	202	76	156	94	162	93	180	110	175	122	165	129	145	125	153	119	181	152	170	127	214
Germany	242	206	237	196	258	193	302	216	324	249	359	264	391	302	341	335	350	354	289	325	339	253	291	203	327	312	214	340	392	212	227	214	416	212	423	243	405	265	308	385	299	
Hungary	3	1	0	0	0	0	2	0	2	2	1	0	2	2	1	6	4	8	3	4	3	4	0	3	3	2	1	0	3	2	1	3	2	1	3	2	3	3	3	3		
Ireland	1	2	1	1	1	0	1	0	2	1	4	1	4	2	7	1	4	1	0	2	0	4	4	0	4	5	1	2	2	4	2	5	2	4	2	4	1	4	3	6	1	
Italy	37	91	31	113	25	117	38	55	24	53	47	45	44	100	32	44	34	14	31	8	22	10	35	15	24	12	27	18	31	23	32	8	30	4	36	11	37	63	38	57		
Netherlands	61	28	51	24	47	16	47	16	66	26	73	28	100	36	82	33	209	80	209	107	252	131	210	98	212	97	190	61	170	36	200	36	233	35	213	20	204	34	207	44	213	33
Spain	1	17	2	16	2	7	5	15	1	14	2	13	2	8	3	19	4	12	5	20	4	22	4	23	4	26	9	27	8	24	9	27	6	29	9	20	9	19	16	22	13	21
Sweden	18	28	25	28	41	45	34	47	31	39	29	59	37	54	26	18	32	15	28	12	25	16	25	19	20	29	15	22	19	8	30	14	29	13	29	14	31	14	25	14		
United Kingdom	154	67	129	72	160	55	155	48	161	87	158	84	148	51	115	66	119	59	87	39	96	37	80	48	102	56	93	47	106	42	109	38	120	39	99	44	122	53	143	51	108	54
All others	1	24	0	37	1	26	4	20	3	15	2	22	4	20	6	27	10	33	8	38	14	27	4	6	23	6	28	9	45	11	56	12	42	15	52	12	50	16	51	13	46	
Other Europe	40	240	49	140	44	150	54	149	53	154	77	188	77	246	63	193	58	196	40	197	50	227	42	263	56	203	46	180	40	168	66	187	71	236	69	182	73	232	64	222		
Former Soviet Union	1	18	0	5	4	5	2	8	1	7	2	23	3	56	1	17	3	11	34	1	26	0	31	3	23	2	15	0	14	0	15	2	17	3	22	3	19	1	16	1	12	
Norway	1	2	1	5	1	2	0	2	4	6	4	5	6	3	8	7	5	6	4	3	4	4	1	4	3	2	1	5	4	2	1	8	2	6	3	2	3	0	3	1		
Russia	10	203	10	116	5	126	10	113	8	125	8	134	15	160	17	147	15	154	17	133	10	173	6	208	13	162	7	150	13	133	13	149	10	159	12	194	12	142	193	6	186	
Switzerland	25	16	37	14	36	18	40	25	39	16	43	26	53	27	37	22	34	22	27	25	32	21	33	18	35	16	35	11	27	18	47	22	44	9	51	13	47	20	59	23	53	24
All others	2	2	0	0	1	0	0	0	0	0	1	0	0	0	0	1	3	0	2	2	3	2	2	2	1	2	0	2	0	0	1	1	0	0	4	0	3	0	1	0		
Asia	4,144	8,817	3,791	9,904	3,831	7,684	3,801	7,155	3,911	7,492	4,230	8,157	4,683	8,368	4,114	9,352	4,933	11,564																								

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	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families			
China	8	16	11	23	11	46	15	68	22	78	30	172	35	362	27	473	27	560	38	795	45	1,732	42	2,006	83	1,957	105	2,417	125	2,682	165	2,230	304	2,522	458	3,877	611	4,289	906	4,970	1,009	5,001	
India	2	2	0	0	1	1	0	0	2	0	3	1	1	6	5	0	1	6	4	4	2	2	2	2	7	5	4	3	11	4	7	4	9	2	12	3	16	5	15	5			
Japan	3,785	8,124	3,387	8,190	3,448	6,297	3,354	6,172	3,431	6,477	3,628	6,534	3,931	5,995	3,358	5,776	3,984	6,284	3,680	7,908	3,716	8,151	4,026	8,485	4,947	9,837	5,152	11,572	5,191	12,214	5,458	11,705	5,802	10,841	5,683	6,377	5,301	7,865	4,532	6,635	4,352	5,928	
Malaysia	2	2	1	1	2	3	1	2	2	2	0	2	1	1	5	5	1	5	3	6	4	6	3	6	2	2	2	6	1	5	5	5	13	4	9	2	3	9	2	6	6		
Singapore	3	3	4	4	4	6	8	6	8	5	10	7	19	7	22	7	12	6	12	7	13	11	13	6	21	11	17	6	18	7	14	4	12	7	27	9	22	8	23	6	18	5	
South Korea	251	540	273	1,535	234	1,144	252	596	246	607	308	1,003	412	1,331	447	2,415	581	3,817	578	4,114	723	2,850	734	1,654	905	2,103	933	2,441	869	3,030	824	3,866	903	2,778	925	1,647	903	2,031	1,001	2,243	905	2,446	
Taiwan	92	129	116	150	134	187	172	311	200	323	252	435	282	669	248	669	327	890	309	1,034	374	493	500	717	587	840	614	1,045	649	1,315	677	1,748	748	1,829	773	1,549	705	1,217	701	1,217	640	756	
All others	1	1	1	1	0	0	0	0	0	0	0	2	2	2	0	0	1	2	1	0	1	0	1	2	0	3	2	3	2	4	4	3	2	5	2	6	5	5	3	8	5		
Middle East	33	13	28	7	27	11	48	14	47	16	64	22	47	17	40	11	50	14	48	9	49	13	58	10	69	20	49	14	63	16	68	16	79	26	68	16	92	21	106	18	121	21	
Israel	33	11	28	7	27	9	47	12	47	14	63	20	46	17	39	11	50	12	48	8	49	12	57	9	68	19	48	14	61	15	75	22	67	15	75	12	86	17	99	15	117	17	
All others	1	1	0	0	1	2	1	2	0	2	1	2	1	0	0	0	2	0	1	0	1	1	0	1	2	1	1	2	4	1	1	4	4	6	4	5	4	7	3	5	4		
Africa	1	4	1	2	0	2	0	4	0	5	1	4	1	3	2	3	0	2	1	4	0	3	0	2	1	1	2	1	0	0	1	1	3	1	4	0	1	2	4	0	3	2	
South Africa	1	4	1	1	0	2	0	1	0	4	0	2	0	1	0	0	0	2	0	2	0	3	0	1	0	0	0	0	0	0	1	0	0	0	2	0	0	2	0	0	3	1	
All others	0	0	0	1	0	0	0	3	0	2	1	3	1	2	1	0	0	1	2	0	1	0	1	1	1	2	1	0	0	1	1	2	1	2	0	0	2	0	2	0	1	1	
Australia and Oceania	10	9	18	9	16	6	15	19	18	19	21	10	28	9	19	10	38	10	24	13	25	11	22	8	30	13	38	22	17	17	23	23	20	24	27	23	20	20	28	17	20	10	
Australia	9	8	17	9	15	6	15	19	17	18	18	9	28	9	17	10	36	9	23	12	23	11	20	7	25	12	37	22	15	17	18	20	19	24	23	23	20	23	16	20	17	18	10
New Zealand	1	1	1	0	1	0	0	0	1	1	3	1	0	1	2	0	2	1	1	2	0	1	2	1	5	1	1	0	2	0	4	3	1	0	4	0	4	0	5	0	2	0	
All others	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Unclassified	0	5	0	63	0	25	1	3	1	4	1	5	1	2	0	12	0	1	14	0	2	0	0	0	0	0	6	0	0	0	5	0	0	0	0	2	10	1	0	1	0	1	

EU = European Union; USPTO = U.S. Patent and Trademark Office.

Note(s)

USPTO patents are allocated according to patent inventorship information. USPTO patents are fractionally allocated among regions, countries, or economies based on the proportion of residences of all named inventors. Patents are classified under the World Intellectual Property Organization (WIPO) classification of patents, which classifies International Patent Classification (IPC) codes under 35 technical fields. IPC reformed codes take into account changes that were made to the WIPO classification in 2006 under the eighth version of the classification and were used to prepare these data. However, because PatentsView only provides the original IPC codes as they appeared on patents and not the IPC reformed codes, current Cooperative Patent Classification codes on patents were converted back to the most recent IPC classification to prepare these statistics. Fractional counts of patents were assigned to each technological field on patents to assign the proper weight of a patent to the corresponding technological fields under the classification. International Patent Documentation (INPADOC) patent families across all patent offices covered in the Worldwide Patent Statistical Database (PATSTAT) are counted according to the year of the first granted patent in the patent family. Patent families are allocated according to patent inventorship information found on the priority patent of the INPADOC patent families. To account for missing ownership information in PATSTAT for some offices, a method designed by de Rassenfosse et al. (2012) is used to fill in missing information on priority patents using information in successive filings within the patent families (see technical documentation for details). Patent families are fractionally allocated among regions, countries, or economies based on the proportion of residences of all named inventors. Because of data coverage issues for some patent offices in PATSTAT, statistics for some countries may be underestimated partially for some years or across the whole trend. Countries with identified issues include India (missing data) and South Africa (no data for 2018). For Italy, because of data gaps regarding information on granted patents, patent applications are used instead, which slightly overestimates Italy's output and creates a small shift in the year for which its output is accounted. The EU includes 28 member countries. China includes Hong Kong.

Source(s)

Science-Metrix; PATSTAT, accessed April 2019; PatentsView, USPTO, accessed June 2019.